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Original Articles

Diphtheria Immunization

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It has been said that the Schick test is one of the most reliable agents for determining an individual susceptibility to diphtheria, and that an immunity can be acquired in those susceptible by the proper administration to them of diphtheria toxin-antitoxin. Reports of sufficient tests also have been made to warrant us in saying that 12 to 14 per cent of all individuals are normally susceptible to diphtheria. We have failed to find, however, any report of any recent epidemic in a definite locality or hospital that was checked by means of the Schick test and immunization.

During the past year at the State Hospital for Insane at Danville, Pa., we have had an opportunity to study the Schick test and immunization, and although our findings are not distinctly illuminating and convincing, they are possibly worth recording.

During the past three years at this institution, from the early fall to and including the late winter months, there have been epidemics of diphtheria in the female department. There were observed during this period forty-two cases: from June to June, in 1918-19, twenty cases; seven in 1919-20; and fifteen in 1920-21. When the disease made its appearance last fall it was decided to Schick the entire female population, nurses and patients.

Over eight hundred patients and sixty nurses were tested. Of these we found that the average number susceptible to diphtheria was less than fifteen per cent. The reaction was characterized by a dull-red area corresponding to the vesicle, with a secondary areola which was dusky-red in appearance, turning brown, with a light desquamation, and becoming extinct in about six days. The reaction was read at the end of seventy-two hours, thereby eliminating any possibility of a pseudo-reaction, the latter usually fading within twenty-four hours, and differing from the true reaction in the absence of the secondary areola and desquamation.

Technique.—The skin over the cubital fossa of the forearm is thoroughly cleansed and dried. A graduated hypodermic syringe and needle of about 25 gauge, sterilized, is used. The toxin is mixed with normal saline solution and 0.2 Cc. is injected intradermally into the prepared area. If the technique is properly carried out the site of the injection is raised, blanched, and shows a pitting of the hair follicles.

The control test is made by using heated

diphtheria toxin, and with scientific precision the solution is injected intradermally into the cubital fossa of the opposite arm. If the same arm is used, the two injections should not be closer than two inches.

Immunizations.—Of the total number of cases, five hundred and sixty were more closely studied. Of these 14.9 per cent gave a positive reaction and were therefore immunized; this immunization consisting of three injections of toxin-antitoxin, each injection followed by an interval of from five to seven days. The toxin-antitoxin mixture was used undiluted. The dose of one milligramme was injected subcutaneously into the arm at the deltoid insertion.

Reaction.—These injections were followed by local and systemic symptoms. Within twenty-four hours the arm became swollen and red, the swelling in some instances extending below the elbow. After thirty-six hours the arm was hard and took on a purplish color. This reaction was most marked in individuals between the age of forty and sixty.

The systemic symptoms in some were pronounced. Headache, malaise and temperature elevation from one to three degrees were noticed. The axillary glands did not show any marked enlargement, and the local reaction subsided in ten to twelve days. It was found that these symptoms could be moderated to a great extent by giving a course of calomel and saline twenty-four hours prior to the injection. The treatment consisted of rest in bed and local applications of saturated solution of magnesium sulphate to the part.

Retesting.—After twelve weeks, which is required to establish the immunization, the 14.9 per cent which gave a positive reaction were again tested. Of these, 5 per cent gave a strongly positive reaction and 3 per cent gave a mildly positive reaction. The strongly positive gave a large, distinct areola, and the mildly positive a slight areola beyond the site of the papule.

CASE OBSERVATIONS.

Case No. 1.—Miss S. gave a history of having had diphtheria in December, 1919. No antitoxin was given at the time, as it was a case in which diagnosis would have been overlooked if not for laboratory findings. In the general routine testing she gave a positive Schick reaction.

Case No. 2.—Miss F. gave a positive Schick test. She was immunized by three doses of toxin-antitoxin. On January 2 she was admitted to isolation with a distinct membrane on tonsils and uvula. Culture positive for Klebs-Loeffler bacillus, and 25,000 units antitoxin given. On February 4, the laboratory reports still being positive, the virulence of organisms found was tested on a guinea-pig, which was afterwards posted. The pig's peritoneum was reddened; abdomen contained a large amount of cloudy looking fluid. Plastic exudate was noted on liver and intestines. A 24-hour culture of the blood serum showed a pure culture of Klebs-Loeffler bacillus. The patient's throat was rather persistent in positive cultures, and tonsillectomy was finally resorted to and cleared up the situation. She was later tested with the Schick test and gave a negative reaction. In this particular case, presumably, sufficient time had not elapsed for complete immunization and in the interval she contracted the disease.

Case No. 3.—Miss A. Schick test October 3, 1920. Result negative. October 15, 1920, developed clinical diphtheria; 25,000 units antitoxin was given and patient made good recovery.

Case No. 4.—Miss E. F. Schicked October 3, 1920. Result positive. Was given two doses toxin-antitoxin Five days after second dose she developed some membrane on tonsils, which did not spread to uvula. Temperature was normal. After 10,000 units of diphtheria antitoxin was given, temperature rose to 103°. Organism, revealed by test on guinea-pig, showed to be virulent type of Klebs-Loeffler bacillus.

CASE SUMMARIES.

In the summary of these cases we find one patient who in 1919 was diagnosed to be suffering from diphtheria on the laboratory findings, but received no antitoxin,

recovered, and when Schicked gave a positive reaction.

In Case No. 2 the toxin-antitoxin did not have sufficient time to create an immunizing number of antibodies.

Case No. 3 gave a negative Schick and later developed diphtheria. This case might be an exception to a general rule.

GENERAL CONSIDERATIONS.

The facts presented herein show that, in this particular institution, diphtheria has been prevalent in the early fall and late winter for three distinct years; that, in the beginning of a most recent outbreak, the Schick test and immunization were resorted to to control and eliminate the disease; that subsequent to established immunization no further cases have developed in those Schicked and those immunized; that there were, however, three cases which developed during the period of twelve weeks required for immunization, one of which had given a negative Schick, a second case which had had three doses but did not establish an immunity, and a third case which had had two immunizing doses of toxin-antitoxin. Were the immunizations, therefore, responsible for checking the disease?

At first glance an unreserved decision would be given in favor of immunization, but further study shows that of the 14.9 per cent who were immunized, eight per cent on a retest gave a definitely positive reaction. Five per cent of these were markedly positive and three per cent mildly positive, revealing to us that the entire population was not immunized and eight per cent still remained susceptible to the disease. Had the disease, therefore, run its course?

Then, too, we must consider that during this period a more strict isolation and quarantine was practiced than ever before; that quarantine was adhered to until three consecutive negative laboratory findings were reported; and in a few cases tonsillectomies were resorted to before the area of infection was entirely culture-free from the bacillus of diphtheria.

CONCLUSIONS.

1. Owing to the long period required (twelve weeks) for establishing immunity by the use of diphtheria toxin-antitoxin, the remedy would be of little value in checking an epidemic.

2. In an infected area, where it is impossible to locate and isolate carriers and occasional cases are constantly occurring, it may be of value. The results of our efforts in this respect will be definitely proven within the next year.

3. To insure complete immunization, it is necessary to retest twelve weeks after the administration of diphtheria toxin-antitoxin. In the event the individual still gives a positive reaction, this shows that further time is required for diphtheria toxin-antitoxin to establish an immunity.

4. Fourteen to fifteen per cent of the patients were found to have a positive Schick. Twelve weeks after immunization of these cases by toxin-antitoxin, retesting showed that 8 per cent of the 15 per cent (or 1.25 per cent of the 560 patients) were still positive.

A Diary of Robert Battey, M.D.

BY HOWARD A. KELLY, M.D.

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I was recently called to Rome, Georgia (May 8th), to give the address on the unveiling of the Battey monument, a simple, handsome granite shaft, set up on the main street near the public library. On that occasion I read a letter privately written by Battey from Europe on the event of his attendance at the International Medical Congress of 1881, in London, when Billings also took so prominent a part. This admirable letter I was told has never been published in any medical journal, although it was evidently written for publication. It is a remarkable piece of writing, thrilling with interest in all the important questions which filled the minds of our immediate predecessors.

It is obvious that Battey was everywhere received as *primus inter pares,* and that with his natural great ability and innate Southern courtesy, he proved no mean representative of our country. Although strongly tempted, I forbear any detailed comment on this delightful, refreshing letter, which wafts across the threshold of the twentieth century a fragrant breeze from the near and dear past, when so many of the giants on whose shoulders we stand were in the heyday of their splendid activities.

My Summer Vacation in 1881.

By Robert Battey, M.D., Rome, Ga.

Worn down by a series of years of professional labor, unbroken by a single month of rest or recreation, the invitation of the International Medical Congress to open a discussion at the London meeting, in August last, afforded me a convenient excuse for withdrawing myself for a time from my daily toil to inhale the invigorating atmosphere of the broad ocean, and recreate a tired brain in pleasant rambles in the old world across the sea, of which I was but too glad to avail myself.

Quartered in one of the officers' staterooms upon the spar deck, with Prof. W. T. Briggs of Nashville, as whole-souled and enjoyable a traveling companion as heart could wish, I sailed from New York upon the 6th of July in the *Bothnia,* one of the large and staunch ships of the Cunard Line. Drs. Darling, Noegerath, and Pallen, of New York, and Hunt of New Jersey, were of our party, and with Bishop McTyeire of Tennessee, Gov. Bedell of New Jersey, Sir Edward Thornton, British Minister, and Mr. Joel, British Consul at Savannah, helped to while away the long days of an ocean voyage.

Towards the close of the journey, on a stormy day, a rather portly gentleman of New York lost his footing upon the slippery deck and received a heavy fall and dislocated shoulder-joint. The medical officer of the ship, a member of the Royal College of Surgeons, London, failed to recognize the injury when pointed out by Prof. Briggs, and I was called to the consultation. Briggs established the diagnosis by the valuable sign of Dugas of Augusta, of which the M.R.C. had never so much as heard in his London pupilage, and reduced the luxation. The patient was with us again on our return voyage and quite recovered of his injury. So much for the value of Prof. Dugas' discovery.

Having enjoyed the opportunity of seeing St. Patrick in his native bog and of kissing the Blarney Stone to my full satisfaction some years before, we put Briggs ashore at Queenstown for Cork, Killarney, Dublin, and Belfast, whilst I steamed on with the ship to Liverpool.

As it was my especial desire to acquaint myself fully with the latest improvements in ovariotomy, I dispatched Keith at Edinburgh at once, and learning that he had work in hand I took the earliest Caledonian train. Upon my arrival my old friend,

Prof. Alex. Simpson of the University, took possession of me, and at his town house and at Craig Royston, his delightful summer residence by the seaside, rendered my sojourn so enjoyable as quite to reconcile me to repeated disappointments in witnessing anticipated operations.

Simpson is, I take it, about my own age. Endowed with stronger constitution and more self-care he is better preserved and not so frosted by age. He is a true Scotchman and a zealous Presbyterian, and divides most equitably, I think, his heart and his hand between his family, his profession, and his church. Mrs. Simpson, daughter of Wm. Barber, Esqr., a wealthy barrister of Edinboro, is a lady of culture, sprightly and interesting in conversation, full of womanly accomplishments and a devoted wife and mother. She is rather delicate in constitution but yet preserves many reminders of a former youthful beauty. She has three children, fine boys, ranging from two to eight years.

The town house is the former residence of Simpson's illustrious uncle, who here entertained me, with his generous hospitality, when I was an obscure boy, as it were, wandering alone in a strange land. It was here that I was enabled to study for days the temper of mind and the methods of that truly wonderful man, to admire his genius and to catch a spark of his enthusiasm. Those few days mark an epoch in my history which gave direction to much of my subsequent life. In the drawing room hangs a colossal portrait of Sir James, a very admirable likeness, which brought back to me the man and the occasion most vividly and impressively.

During my stay Simpson chanced to have nothing of particular interest for operation. In his wards, at the Royal Infirmary, I saw a case of recent extirpation of the inverted uterus, which was promising well, and several other cases of interest. His senior assistant, Dr. David Berry Hart, is a young man of large head, well filled with brains, which he is daily using to good purpose. It requires no special gift of prophecy to foresee for him a brilliant professional career. It is not often that I have met a young man who has so much impressed me. He has already done good work and we shall hear more from him in the future.

In company with Dr. A. H. Barber, Simpson's junior assistant, I spent two or three days most delightfully at the country seat of his father near the geographical center of Scotland. Bonskied is the old ancestral estate of Mrs. Barber. It is reached by a three-mile drive from either Pitlochry or Killiecrankie, stations upon the railway. The estate covers a wide expanse of forest of larch, Scotch fir and birch, wild and romantic in its Highland ruggedness, and affords abundance of good shooting ground in the season, which is a source of quite an income to the proprietor. It is watered by two small rivers, the Tummel and the Garrie, which wind about in the dark mountain gorges and here and there take a downward plunge, through broken rocks, in pretty cascades. The Tummel affords good salmon fishing, the evidences of which were daily seen upon the sumptuous table at Bonskied. The Garrie flows through the narrow mountain gorge of Killiecrankie, made memorable by the successful stand of the Scottish hero, Wallace, against the English invaders two centuries ago, and empties into the Tummel near the lower border of the estate of Bonskied.

A writer of the eighteenth century thus describes the historical Pass of Killiecrankie: "It is formed by the lofty mountains impending over the water of Garrie, which rushes through in a deep, darksome and horrid channel, beneath. In the last century this was a pass of much danger and difficulty; a path hanging over a tremendous precipice threatened destruction to the least false step of the traveler; at present a fine road formed by the soldiery lent by government and encouraged by an additional sixpence per day gives easy access to the remote Highlands; and the two sides are joined by a fine arch."

The old stone mansion, planted upon an elevated shelf of the mountains and overlooking a deep, narrow valley, with the

river Tummel and its cascades in the foreground, has been much enlarged and ornamented by the present proprietor, Mr. Wm. Barber. In the grand drawing-room hangs a colossal full-length portrait in oil of the great founder of the estate, Alexander Stuart, progenitor of Mrs. Barber, in his day a very noted surgeon, as well as chieftain and lawgiver of the Stuart clan of Highlanders. He is presented in the full tartan of his clan, and his portly mien and rubicund visage are suggestive of the good cheer and overflowing tankards of pure "Mountain Dew" which characterized his time.

Returning to Edinboro, by way of Perth and Stirling, I found Keith with one of his cases ready for operation. Thomas Keith is a pure Scotchman, plain and simple in his manners as in his dress, affable and kind to visitors, not with an apparent purpose but rather from the natural outflow of a kindly heart. He seems modest, almost to a fault, appears to have no thought for himself, but is deeply absorbed in love for science and in his earnest devotion to the welfare of his patients.

Besides myself, Dr. Rosebrough of Canada, and others, were waiting to see him operate. He expressed, and I am sure he felt, annoyance that he could not get his cases earlier in proper condition for operation, but his stern sense of duty would not allow him to deprive a patient of any favoring influence or condition which could add at all to her prospects of recovery.

The operation was done in a rear room of the fourth story in order to secure the best atmosphere and greatest quietude. A well trained nurse has constant charge of the patient. It was "rather a nasty case," as Keith termed it, and not well suited for display, but all the more instructive for that. Every step of the operation was done with precision and the utmost care and attention to detail. He did not hurry—there was no flourish—no attempt at display. But two ideas seemed to possess the mind of the operator—to remove the tumor and to preserve the life. He evidenced no solicitude for the bystanders and none for himself. Having seen Keith, talked with him and witnessed his operation, one has not far to go to find the secret of his wonderful success.

At his dinner table I had the pleasure of meeting Yandell of Louisville, Briggs of Nashville, Rosebrough of Canada, Lawson Tait of Birmingham, and others; and hearing him discuss the subject of ovariotomy in detail, I was quite surprised to learn that he had abandoned the antiseptic spray entirely, and that he regarded it not alone useless, but in two cases, at least, the evident cause of death. He had suffered much in his own person also from hematuria caused by the use of the carbolic spray. He employs the carbolic solution for instruments and sponges and esteems it of value. Lawson Tait joined heartily in the condemnation of the spray, and discards the antiseptics of Lister entirely, relying solely upon the most painstaking cleanliness.

I had the pleasure of meeting Dr. Halliday Croom, Dr. Granger Stewart, Mr. Spence and Mr. Annandale, and was privileged to meet the obstetricians and gynecologists at the Obstetrical Society, but I cannot dwell longer upon my visit to Edinboro.

Accepting his kind invitation I tarried a day and a night with Mr. Lawson Tait at Birmingham and became so interested in his work and so captivated by his generous hospitality that I cheerfully yielded to his solicitation to take me another day and night from the Congress in London, during the following week. Lawson Tait, though an Edinboro man, is not so thoroughly Scotch as Simpson or Keith. He is short, thickset, rather portly in form and c....(obliterated). He is quick-spoken, quick in action, rapid in thought and prompt in his conclusions. He is a pleasant talker and a jolly companion, and altogether a wholesouled, good fellow. His countenance is striking, full of character, and reminds one a little of Sir James Simpson, whose office pupil and assistant he was for some years. He likes a glass of wine at dinner, if it is old and of good bouquet, smokes a fragrant

Havana after dinner, discusses politics with interest and animation, upon the democratic side, and does not trouble himself greatly about the affairs of the church. He is a member of the Council of his city and an admirer of the great American Republic. Tait is a man of energy and push, has much of the enthusiasm and genius of his great master; and although young as yet, his work is well known to you all. That a bright future is before him can scarcely admit of doubt. Mrs. Tait was summering in the Highlands, so I did not meet her. They have no children.

Mr. Tait showed me many of his cases, and amongst them no less than nine, or ten, of my own operation. The results are excellent. I saw two cases of his operations upon the liver, which greatly interested me. He is certainly making progress in this direction. He opens the abdomen for diagnostic purposes and deals with whatever he may find, with a boldness and dash which are only equalled by his skill and dexterity. To see him do some of these operations is well calculated to elevate the hair upon the head of a timid man. That he meets with professional opposition and is much criticized goes without saying. How would it be otherwise?

Mr. Tait invited me into his operating room at his private infirmary. A case for ovariotomy was upon the table. There were but four persons in the room, all told. Turning to the surgeon, I asked: "Where are your assistants?" "You are enough," was the prompt reply. "With you to help me I will do anything that is to be done. I need no more." A nurse administered the ether, Tait stood upon one side with his instruments at hand, and I opposite. The operation proceeded with the greatest celerity and system. The case proved a complicated one, but was handled with the composure and dexterity of a master. A half-dozen assistants could have added nothing to be desired.

In operating he has the patient well strapped to the table with webbing. A napkin is spread over the face and the ether is steadily dropped, drop by drop, upon the napkin. No attention is given to the pulse, the breathing is observed and occasionally the napkin is raised for a moment that the operator may see the countenance of his patient and be assured of her safety. Instruments lie in gutta-percha trays covered with pure water. His hemostatic forceps are of his own pattern and made at Birmingham. He uses no carbolic acid excepting at the Hospital for Women, where the by-laws of the hospital absolutely require its use in every case.

The atomizer formerly used by Mr. Tait is the handsomest and most perfect I have ever seen. It is constructed of German-silver, large in its capacity, throws a full, double spray quite three feet off, and will maintain it for three hours. He pronounced it a useless apparatus in ovariotomy and kindly offered it to me, that I might bring it home to America to show my friends "how not to do it."

At the dinner table of Mr. Tait I met, amongst others, Dr. Thomas Savage, of Birmingham, whose gynecological work is well known in this country. I afterwards met Savage in London, but I have to regret that my engagements did not permit me to see more of him and something of his work. I saw just enough to make me desire to know him better. He seems a very quiet, modest and unassuming man, more anxious for the welfare of his patients and the honor of his profession than for his own advancement. The success of his operations, and the manner in which he presents them to the world, amply attest the honesty of his work.

An attempt to give any adequate account of the work of the International Medical Congress would be, alike, beyond my power to do and foreign to the purposes of this random narration of my personal movements and observations. I went to Europe for rest and mental recreation, not to work. My time was chiefly spent in social intercourse with those I especially desired to meet. The task of writing up the Congress has been ably done by others, much more competent than myself, and their

work is freely accessible in the medical journals.

The general meetings were held in the great St. James' Hall, Regent Street, an immense structure, which the more than three thousand members did not half fill. The Congress was opened and closed with appropriate ceremonies by H. R. H. the Prince of Wales, supported by the Crown Prince of Germany, the president, Sir James Paget, and a large number of the medical and surgical celebrities of the world. It was a little mortifying to Americans to see that the eminently worthy, but very modest, president of our national medical body was not invited to a seat upon the platform, whilst others, little known and less respected at home, found their way there. So large was the body, however, and so immense the labor of arranging the details, it was impossible to guard every point.

The Prince of Wales in his personal bearing, and in his opening address, won golden opinions from all sides and was greeted, time and again, with deafening rounds of applause. The address itself was timely, thoughtful and sensible, and was delivered with a quiet self-possession and dignity which commanded the highest respect. It was an agreeable surprise to one, at least, of his hearers. He is rather short in stature, thick-set, with frank, open countenance, a little bald in front and very handsome. The personnel of the Crown Prince was creditable but much less striking. Both of the prospective sovereigns appeared in plain citizen's dress; the German attended by a small body-guard of handsome young men in very elegant and showy uniforms.

Sir James Paget was beyond question the most happy selection possible for the presiding officer. I heard nothing but golden opinions of him from everybody. He seems to have the heart of the British profession as fully—yes, even more fully—than Gross is enshrined amongst us. His address was a masterpiece in its way, lengthy and exhaustive in its scope, and delivered extemporaneously with an earnestness, eloquence and freedom from hesitancy and interruption quite in contrast with what one encounters in the delivery of very many eminent Britons. The only criticism which I heard made upon him by any of his compeers was that he would persist in giving his opinion for a guinea, the stereotyped fee of a century or more. But this was attributed to his modesty and kindly heart. A prominent surgeon told me that he had sent a lady to him for consultation. He instructed her to provide five guineas wrapped in paper, to ask no question, but put the fee in Paget's hand on leaving. She disobeyed the order and asked the fee. "One guinea," said Sir James. She paid it and carried off the remainder.

I met Paget at breakfast, with perhaps twenty or twenty-five other guests, at his unpretending residence in Hartford Square. He appears to be a man of sixty-five, tall, thin and angular in his build, clean shaved except a slight tuft in front of each ear, with a countenance full of expression but devoid of any pretensions to personal beauty. His form is a trifle stooped, suggestive of humility, which is one of his characteristics, rather than infirmity. He is plain and simple in manner, kind and affable, but dignified and inspiring respect.

Mrs. Paget is a very plain, solid, sensible woman, devoid of personal beauty, frank and communicative. She spoke freely of their early struggles in life, and did not hesitate to tell me that she was a nurse in St. Bartholomew's Hospital whilst he was ward surgeon, and both so poor that they had to toil long and arduously before they were able to marry and support a family. On my left sat a grown daughter and across the table two grown sons, worthy children of so worthy parentage.

Mr. Spencer Wells, the great ovariotomist of the world, with his nearly eleven hundred operated cases, was of course a central figure for me. I lunched with him at his town house, drove with him in his round of calls, roamed over his spacious lawn and gardens at his country seat at Hampstead, consulted with him at the bedside of a wealthy viscountess, but was denied the privilege, which I so much coveted,

of seeing him operate. He had purposely cleared out his cases that he might have leisure for the Congress. He adheres to the carbolic spray, still, in his operations and is constantly improving his results. Mr. Wells is eminently conservative in all he thinks and does, but in no sense is he fossilized. He is a man of sixty or upwards, rather short in stature, stoutly built, but not redundant in flesh, clean shaved, but with scanty side whiskers, an open countenance often lighted by a pleasant, assuring smile. His manner is quiet and unpretending, but self-possessed. He wears glasses constantly. At Hampstead I met Mrs. Wells and a grown daughter. I think he has no son. Spencer Wells has, by his achievements in ovariotomy alone, well earned the honors of knighthood, which Victoria seems a little tardy in bestowing, and his personal fortune I would think ample now to enable him decently to support the title.

Matthews Duncan, little if any my senior, is a handsome, rather portly Scotchman with large head and full of brains. He is a man of mark every way and of distinguished mien which would well befit a gubernatorial chair or senatorial toga. He is the embodiment of aggressive British conservatism, a bold defender of what he conceives to be the right, and a formidable antagonist in the forum of scientific discussion. His influence is as sensibly felt in London as it was upon his native heath at Edinboro. He is always prompt to challenge innovations, and with his ready and skillfully handled rapier he mercilessly evacuates the wind from many a bloated paunch. Perhaps he may be a trifle too conservative and, like our aboriginal neighbor upon the border, may stand so straight as to lean a little backwards, but such men are highly useful to throw their ponderous weight against the many lighter minds whose zeal for progress leads them to the opposite extreme.

In 1859 I met Duncan at Edinburgh and enjoyed his kind hospitality. He was then a vigorous young lecturer upon obstetrics and diseases of women in a side school of medicine, and gave promise of the distinguished reputation which he has since achieved. He had been the office assistant of Sir James Simpson, conducted the experiments which developed the grand discovery of the anesthetic properties of chloroform, and aspired to a share with his great master in the honors bestowed. Dr. Duncan freely extended the hospitalities of his home. I dined with him on Friday, with other guests, met Mrs. Duncan, but none of the children. When I called to take leave the doctor and family were gone to the Highlands for the summer.

On Wednesday I dined with Dr. Playfair, meeting around his hospitable board Marion Sims, Fordyce Barker and Pallen of New York; Schlavanski of St. Petersburgh; Simpson of Edinboro; Kidd of Dublin; Malines and Savage of Birmingham, and others.

At the dinner table of Dr. Grailey Hewitt I met a number of English and American acquaintances and Dr. A. Martin of Berlin. Hewitt is a man of sixty, say, rather less than medium height, a little thin visaged, quite precise in dress and manners, and one would take him for a ruling elder amongst the Presbyterians of New York rather than an Englishman. To me was assigned the pleasing duty of leading the hostess to the dining hall. As in duty bound I did my best to discharge the trust, but was painfully conscious of the fact that my friend Pallen of New York or Miller of Chicago would either of them have done it with so much more elegance and ease. Pallen was not far wrong when he remarked that I reminded him of a stripling attempting to wear his grandfather's hat. The windows of the dining hall look out upon a hot-house and grapery, objects of especial regard to Hewitt. In the ripened grapes upon the table we had creditable evidences of his attention and skill. Two grown daughters, who complete the family circle, entertained us with sweet music in the drawing-rooms after dinner, one at the piano, the other with a skillfully handled violin.

The invitation of Dr. Priestly to dinner

I was obliged to decline, as I had previously committed myself to return to Lawson Tait at Birmingham. I met him repeatedly at his office, at my hotel and at the Congress, and came away regretting that I had not the opportunity to meet him socially in his family. Priestly is perhaps fifty-five, rather tall and of medium build, erect in carriage and elastic step. He wears side whiskers; a pleasant, genial smile lights up most agreeably a rather handsome face. In manner he is gentle, polished, and winning. That he must be a favorite with the ladies can easily be seen.

In company with Sims, Yandell and others, I lunched with Mr. Ernest Hart, the editor of the *British Medical Journal*. The grand success attained by that publication is a living attestation of the genius of its editor. Hart is a small man, of middle age, thin visaged, with keen, sparkling eye, clean shaved, rather thin grizzly hair. His temperament is highly nervous. He is rapid in movement, quick spoken, and a capital talker. He wastes no thought upon his personal appearance. Mrs. Hart is a very plain woman, full of intellectual force and an accomplished musician. She has devoted much time to the study of medicine and is still pursuing it. I imagine she is an important aid to her husband in his professional labors. They have no children.

I called upon Sir Henry Thompson, who lives quite near to Mr. Hart. He, too, like Spencer Wells, had thrown aside his work that he might devote his time to the Congress. He showed me his magnificent collection of stones, pointed out those removed from the Emperor Louis Napoleon and the King of Belgium, and exhibited the instruments used with each.

Sir Henry is below medium in stature, thin in flesh, small and narrow in his brain vault, not prepossessing in facial expression, self-assured, and rather patronizing in manner. It is difficult to resist the conclusion that the sources of his unquestioned greatness must be sought in the dexterity of his hand, and fortunate surroundings, rather than in the natural outcome of a broad intellectual endowment.

I dined with Dr. John Williams at the Devonshire Club. He was one of the secretaries of the Obstetric Section of the Congress. Williams is one of the rising young men of the metropolis, plain, practical, industrious. If I mistake not we shall hear more from him in the future.

I lunched with Knowlesly Thornton and saw him do ovariotomy at the Samaritan Hospital for Women. I saw Bantock do the operation also upon another day. Thornton and Bantock are both former assistants of Spencer Wells and have joint charge of the Samaritan since Wells' retirement. They are arrayed upon opposing sides of the spray question, Thornton joining Wells in its advocacy, and Bantock discarding it with Keith and Tait. Both of them are expert operators and secure most excellent results. Thornton, Bantock and Heywood Smith are among the rising young men of London with future before them. Bantock is a very handsome fellow, but Thornton I thought the more intellectual of the two.

One day as I sat in the room of the Obstetric Section, awaiting the opening of the meeting and engaged in quiet meditation, a heavy hand slapped me familiarly upon the shoulder and a deep, sonorous voice asked, "Is this Battey, from Georgia?" "Yes," I responded with surprise, as I rose from my chair and, turning around, confronted a three hundred pound specimen of youthful John Bull. "And this is Milner Fothergill, of London," he continued with a broad, pleasant smile. We shook hands and were friends at once, but the opening of the session soon ended our talk. It was my intention to extend, by a call, my acquaintance with one whose writings I read with such interest and profit, but so much was to be seen and done and the time for seeing and doing was so brief that I was not able to fulfill the purpose.

The entertainments given to the Congress were very numerous and upon a scale of sumptuous grandeur which only the great metropolis of London could offer. I can speak personally of only a few of them. Some of these entertainments were

general and included the entire Congress, others were more select, and a few quite restricted. Of the first class may be mentioned the opening *conversazione* in the gardens of the Kensington Museum on Tuesday evening. My trip to Birmingham prevented my attendance. The concourse is said to have been immense and the evening one of the most enjoyable. The banquet and promenade at the Guildhall, given by the Corporation of London, at a reputed cost of no less than thirty-five thousand dollars, was, of course, a grand affair and very largely attended. Another large gathering assembled on Monday evening at the *conversazione* given by the Royal College of Surgeons in their commodious building, in which the spacious halls and corridors of the great Hunterian Museum, brilliantly illuminated by electricity, offered ample scope for promenade and material for entertainment. The invaluable collections gathered here were also opened for several hours on Sunday, to those who did not see fit to avail themselves of the special religious services at St. Paul's and Westminster Abbey, for which tickets were distributed to secure seats.

Amongst the smaller gatherings I can speak personally of the garden party of Mr. Spencer Wells at his beautiful country seat, Galder's Hill, Hampstead, three miles from my quarters at the Langham, and a similar garden party given by the Baroness Burdette-Coutts, who, it will be recollected, created a sensation not long ago by her marriage with our young countryman, Mr. Ashmead Bartlett, very much her junior. The latter entertainment was marred by an unlucky shower of rain which compelled the visitors to seek shelter in the elegant mansion or flee to their lodgings.

It was my good fortune, at the two especially select gatherings, the Lord Mayor's dinner on Thursday and the Saturday evening reception of the Countess Granville, to find myself possessed of the wedding garment. The Mansion House dinner included a selection of about two hundred guests from the three thousand three hundred members. Amongst the more noted names, familiar to you all, I may mention: Huxley, Schlavansky, Pantaleoni, Charcot, Esmarch, Erichsen, Sir James Paget, Von Langenbeck, Sir Risdon Bennett, Donders, Virchow, Pasteur, Tarnier, Sir Henry Thompson, Brown-Sequard, Martin, Von Hebra, Sharkey, Keith, Verneuil, Carl Braune, Simpson, and Lister. Of the dozen Americans present the names of Billings, Austin Flint, Bigelow, Fordyce Barker, Goodell, Sayer and Jacobi are familiar to you.

The evening was enlivened by music from the noted band of the Coldstream Guards, posted in an elevated gallery, interspersed by vocal music from professional artists. The ancient ceremonial of drinking the health from the Loving Cup was introduced by the Lord Mayor and followed by the entire assemblage of guests. To me it was novel and impressive.

The reception of the Countess Granville, at the official mansion of the Foreign Secretary, was the most *recherche* affair of the entire week. Besides foreign delegates of supposed eminent distinction, the foreign ministers at court, with their ladies, were included in the gathering. The simple splendor of the polished white marble halls and grand stairway gave a fitting prelude to the chaste elegance of the Countess herself, who stood within the entrance door to the drawing-rooms, arrayed in simple white and covered with sparkling diamonds, gracefully receiving her guests. Earl Granville, too, had left his invalid couch and sat in a chair at the head of the stairway pleasantly greeting the guests as they ascended. The Earl is a handsome man of middle age, but a martyr to that aristocratic, essentially English disease, the gout. Sir James Paget remarked to me that the Countess is very generally esteemed the most beautiful woman in all England. My own taste in such matters quite justified his opinion.

Although surfeited with the feasting of London and well-nigh worn out by attendance upon the Congress, I greatly desired to see the British Medical Association as a distinctive body. I therefore went at once

to Ryde in the Isle of Wight, the great summer resort for Londoners, where the Association had already opened. Here I met with our countrymen, Billings, Toner, Yandell and Pitman of North Carolina, who were moved by a similar impulse. The meeting was but poorly attended, and seemed tame indeed after the grand gathering in London. This was to be expected, but we enjoyed the beautiful scenery and delightful sea-breezes of the island and were diverted by the races of the Royal Yachting Club, under the patronage of the Prince of Wales, then going on at Ryde. In the Association no distinction is made between foreign, certified delegates and ordinary members. We paid our guinea for registering and our guinea for dinner and mingled with the other members. We do things a little differently at home. The dinner did not excel either in quantity or quality, but we made the best of it. My next-door neighbor, a member from Liverpool, was so loud in his complaints and so boisterous in conduct as to be menaced by the police. Pitman and I found our own in quietly withdrawing to our hotel. From the hill at Ryde in full view stands the royal palace at Osborne, where the queen was summering until the close of Parliament, when she goes to Balmoral in the Highlands.

From Ryde I returned to Southampton and crossed the channel with Dr. Pitman and his daughter to Havre and on to Paris, where we found Briggs of Nashville and Howard of Baltimore. I called, of course, upon our countryman, Dr. Edward Warren Bay, of Egyptian fame, who is pleasantly ensconced in Paris. His quarters are very central and he seems to be doing good business. His clientele, he tells me, is chiefly French, not American, as one would have supposed. He maintains a handsome carriage and horses, which he kindly placed at my service. He has at the head of his establishment a polished ebony darkey from Baltimore, who speaks French well and orders the French coachman around with an air of authority and true African dignity, which show that he enjoys the situation.

Marion Sims was comfortably established for the summer with his family in the Rue de Pontieu, quite near the Champs Elysees. It was cheering, indeed, to see him so nearly like himself, so bright and happy and with such returning vigor, after the severe, and well-nigh fatal, illness of the previous winter. Long may his valuable life yet be spared to bless his family, our common profession, and the world at large! In company with Pitman, Miss Pitman and Howard, I dined at his hospitable board, and we passed a delightful evening with his family.

With my personal observations in Paris I will not detain you. I am admonished that this hasty and random sketch has already far exceeded my intention and perhaps wearied your patience. The length of my tether from home was drawing to a close, so I hastened back to England to fulfill an engagement, accepting the hospitalities of Lord Holmesdale at his country seat near Maidstone, which a lucky chance had thrown in my way. Here I spent a delightful week behind the social wall which separates the English aristocracy from the common people. The observations and experiences of that week would give ample scope for hours of familiar chat. I cannot enter upon it here.

From Maidstone to London, and thence to Liverpool, where I met by appointment my companion, Briggs, just back from Switzerland and the Rhine. We re-embarked in similar quarters upon the same staunch ship, the *Bothnia,* for a rather stormy return to America. I paid, as usual, my full homage to the angry old god, Neptune, who was so exacting that the hitherto invincible Briggs found difficulty at times to keep on deck and maintain his gastric equilibrium. Landing in due season at New York, I instinctively drew in a fresh inspiration of the pure atmosphere of American liberty, and returned to my home in the mountains more enraptured than ever with its wild and beautiful natural scenery, and its remoteness from the stiff and heartless forms and ceremonies of the great metropolitan cities of the world.

The Oculo-cardiac Reflex and its Therapeutic Value[1]

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The reflex to which attention was called first in 1908 by Ashner (*Wiener Klin. Wchn.*, 1908, p. 1520) presents a great variation in normal and pathological states. It consists in the majority of normal cases of a retardation or slowing up of the pulse within five or twelve beats per minute produced by compression of the eyeballs during one-quarter or a half of a minute. In addition to the cardiac phenomenon the following symptoms are not infrequently observed: headache, vertigo, noises in the head, sensation of heat or cold. The predominant symptom is the bradycardia, which is almost constantly in direct relationship to the degree of the ocular compression. The best procedure for obtaining the reflex is to place the individual in a lying position, the head well rested and the eyes closed. With the pulp of the index-finger compression of the eyeballs is produced by pushing the eyeballs into the orbits. Among the phenomena mentioned above the cardiac manifestations are the most conspicuous. When only the right eye is compressed, the cardiac rhythm is more modified than when the compression is done over the left eye—that is, pressure over the left eye produced a less marked bradycardia than with the opposite eye. Binocular compression gives about the same results as right monocular compression. The average diminution of pulsations in normal individuals is from five to twelve. Curiously enough, in very exceptional cases instead of bradycardia acceleration of the cardiac rhythm is observed.

As to the reflex pathway, in all probability it follows from the eye through the branches of the fifth nerve to the medulla, from which center it reaches the moderators or accelerators of the heart, and according to which of the latter is stimulated, bradycardia or tachycardia will be the result. Such a pathogenesis could readily explain all other phenomena concurrent with the disorder in the cardiac rhythm.

The investigation of the oculo-cardiac reflex was conducted in a large number of the following pathological conditions: Hemiplegia, epilepsy, paralysis agitans, Graves's disease, multiple sclerosis, tabes, and paresis.

OCULO-CARDIAC REFLEX.

Figures indicate diminution of number of pulsations.

Epilepsy, 27 cases.	Tabes, 19 cases.	Paresis, 5 cases.	Paralysis Agitans, 10 cases	Graves's Disease, 7 cases.
5 cases—12. 12 cases—18. 8 cases—20. 2 cases—30.	13 cases—absent. 3 cases—3. 3 cases—3.	2 cases—30. 1 case —38. 1 case —35. 1 case —40.	6 cases—absent. 1 case —5. 1 case —8. 1 case —2. 1 case —3.	3 cases—15. 1 case —25. 1 case —38. 1 case — 5. 1 case —absent.

Disseminated Sclerosis, 3 cases.	Hemiplegia, 12 cases.
2 cases—absent. 1 case —5.	10 cases—absent. 2 cases—10.

In cases of epilepsy (27) the writer found intensification of the reflex; instead of 5 to 12 pulsations per minute, there was

[1]Read at the June meeting of the College of Physicians.

a diminution of 12 to 30 beats, more pronounced in females than in males. While the range of rhythm variation is large (12 to 30), nevertheless it was always constant in the same individual during repeated examinations.

Most interesting data were obtained in tabes. Nineteen cases of tabes were repeatedly examined for the oculo-cardiac reflex. The latter was found absent in 13 and decidedly diminished in 6 cases. The decrease of the number of pulsations was three and four. In the cases with abolition of this reflex, the Argyll-Robertson pupil was present. In three cases with diminution of radical pulsations the Argyll-Roberston phenomenon was absent, but the oculo-cardiac reflex eventually disappeared, and then the Argyll-Robertson pupil made its appearance. These facts are highly important from a diagnostic standpoint, as it adds a valuable sign to the group of signs well known, and it may lead to the proper recognition of the disease in its early phases when the pupilary reflexes are still normal. Moreover the abolition of the oculo-cardiac reflex is an indication of an ascending course of the tabetic process showing an involvement of the bulbar sensory roots.

In five cases of paresis the oculo-cardiac reflex was pronounced. Compression of the eye-globes produced a diminution of the number of pulsations from 30 to 42. This is an indication of disturbance along the pathway of the arc reflex from the trigeminus to the medulla, or from the medulla along the pneumogastric or sympathetic nerve, or else in the medulla itself. Bulbar symptoms are not infrequent in paresis, such as disturbances of secretory function, vasomotor, respiratory and circulatory disorders, difficulty of deglutition.

Ten cases of paralysis agitans were examined for the oculo-cardiac reflex. In eight of them the Parkinsonian picture was bilateral. In two of the eight cases there was no tremor, but the other symptoms were all present, viz., mask-like face, stiffness of the trunk, general attitude, small steps in walking, finally the propulsion phenomenon. The oculo-cardiac reflex investigated in each of these sub-groups was found totally absent in six of the bilateral cases in which the characteristic tremor was present. It was normal in the two bilateral cases without tremor. It was diminished (2 and 3 pulsations respectively) in the two unilateral cases, more feeble when ocular compression was carried out on the affected side than on the opposite side. If one considers the anatomo-pathological data of paralysis agitans, one finds a diversity of disorders, but their elective localization is bulbo-pontine. The trigeminal nerve, the afferent part of the reflex arc under discussion, enters the pons on the external side of its inferior surface where the middle cerebellar peduncles join it. Disturbance of equilibration, static and dynamic, is present in paralysis agitans; the tremor itself is one of its manifestations. A lesion, therefore, in the pons, in the vicinity of the nucleus of the fifth nerve (which is the center of the oculo-cardiac reflex), leaving intact the sensorimotor but affecting the cerebello-bulbar pathways, will readily explain all the symptoms of Parkinson's disease as well as the abolition or diminution of the oculo-cardiac reflex.

A very interesting condition was found in the unilateral cases. In testing them for the oculo-cardiac reflex it was observed that not only the latter was more altered on the affected side than on the other, but also the ocular compression increased the tremor on the corresponding side. It seems therefore that the oculo-cardiac center in the mesencephalon is in close vicinity with a center a lesion of which is apt to produce tremor.

Seven cases of exophthalmic goitre were examined. Five presented a marked accentuation of the oculo-cardiac reflex; the number of pulsations decreased 15 to 38. One case without exophthalmos presented only a slight diminution of the pulsations (5); in the remaining case the reflex was absent. Here the manifestations of Graves's disease were exceedingly slight. The interpretation of the alterations in the number of cardiac pulsations can be here explained on the basis of different states of the pneumogastric and the sympathetic nerves.

Ordinarily in Graves's disease there is a hyperexcitability of both nerves (as proven by administration of pilocarpine and adrenalin). According to the researches of Eppinger and Hess some cases react to substances that are apt to modify the function of the vagus such as pilocarpine, producing the following symptoms: salivation, perspiration, flushes of heat, and peristaltic movements of the gastrointestinal tract. In other cases of Graves's disease the above reaction is absent, but under the influence of adrenalin, which is a modifier of the sympathetic function, it produces tachycardia, glycosuria, and polyuria. In a third series of cases we find a combination of both groups of phenomena in the same case; we have then a form of Graves's disease which is both vagotonic and sympathicotonic. According to the degree of hyperexcitability of each of the nerves the oculo-cardiac reflex denotes a diminution in the excitability of the pneumogastric nerve without any alteration in the state of the sympathetic nerve.

Three cases of multiple sclerosis were examined. In two the oculo-cardiac reflex was absent. In one the reflex was present and without any alteration. Considering the variability in the localization of the lesions in this affection the diversity of the oculo-cardiac reflex is readily explained. There was undoubtedly a plaque of sclerosis in the medullary center of the reflex arc in the first two cases and no lesions whatsoever in the center, and in the centripetal or centrifugal portions of the reflex arc in the third case.

Twelve cases of hemiplegia were examined with the following results: In eight the oculo-cardiac reflex was absent when tested by ocular compression on the paralyzed side, normal when tested on the normal side. In two cases it was abolished when binocular compression was carried out. In two cases of very mild hemiplegia the oculo-cardiac reflex remained normal. These findings are suggestive not only with regard to the diagnosis of a unilateral lesion of the motor tract, but also to the differentiation of an organic from a functional nervous disorder.

In view of the clinical observations concerning the oculo-cardiac reflex, in view of the associated phenomena observed during the ocular compression, in view of the pathogenesis of the reflex in which the medulla is considered as the center of the reflex, the question arises whether alterations in the function of the various portions of the reflex arc as obtained by ocular compression could not be utilized in the treatment of some manifestations having its origin in the medulla. With this idea in mind the writer attempted to modify tachycardias, tremor, hiccough, persistent sneezing, hysterical paroxysms, phenomena of thyroidism.

In *anxiety neurosis* the patients not infrequently complain of paroxysms of tachycardia. Five such cases were kept under observation. Besides the mental attitude the tachycardia was particularly distressing and indeed intensified the patient's hypochondriacal ideas. The patients (four females and one male) were instructed during the attacks of cardiac palpitation to lie down and with the index-finger compress both eyes during a half of a minute. Relief was obtained in every instance. The pulsation decreased considerably and remained so for several hours until the next attack. The success was so striking that the patients never failed to have recourse to ocular compression as soon as the attacks of tachycardia made their appearance. They learned through experience how deep the compression should be made in order to obtain satisfactory results. It is to be borne in mind that in each of the five cases there was no organic lesion of the heart.

The ocular compression did not remove the cardiac neurosis, but whenever the cardiac irritation made its appearance it diminished considerably the precipitated heart action and not only gave subjective relief but also exercised a sedative action on the cardiac muscle. The total disappearance of the cardiac phenomena took place only when the anxiety neurosis through other therapeutic channels was removed. The beneficial effect of the ocular compression was strikingly evident.

The same experience was observed in

paroxysms of tachycardia in seven cases of *hysteria*. Two of them were particularly pronounced. The patients' pulsations would reach during the attacks 160 and 180 respectively. Ocular compression succeeded in decreasing the number of beats to 86 and 72 respectively. In the entire group the oculo-cardiac reflex was utilized to the greatest advantage. The patients learned how to produce it and to what extent to press the eyeballs into the orbits.

Of special interest the procedure appeared to the writer in one case of *hiccough* and in two cases of *persistent sneezing*. The first case is that of a clergyman who, being of a neuropathic make-up, developed a fear every time he had to deliver a sermon. He trembled, became pale, felt weak. This would last a few moments, after which hiccough would make its appearance. The latter would last several hours, and on several occasions two days. Neither bromides nor opiates succeeded in arresting the distressing manifestations. Ocular compression was resorted to. Surprisingly it gave the patient considerable relief on many occasions, and finally the patient succeeded in arresting the hiccough completely. According to his statement the arrest of the disorder was arrived at after several attempts, and only when he learned how long to continue the compression and how deeply to press the eyeballs into the orbits.

Persistent *sneezing* followed in one case an attack of grippe of six weeks' duration and in the other an acute rhinitis. The paroxysms of sneezing occurred at irregular intervals and lasted from a period of thirty minutes to two hours, with intervals of about five or ten minutes. Inhalations of various kinds, sedatives, local applications, have all been tried during the paroxysms, but in vain. Finally ocular compression was resorted to as a palliative to check the sneezing. It gave surprisingly good results. The patients learned how and how strongly to press upon the eyeballs. At no time was the procedure considered curative, but it was extremely helpful during the attacks of sneezing as it succeeded in checking it very early in the attack. The patient eventually recovered.

Two cases with symptoms of *thyroidism* came under observation. They were females with large goitres. They were subject to attacks of tachycardia with chills and a sense of impending death. A fine tremor of the hands was also observable. Ocular compression was applied in these cases as a tentative measure during the attacks for relief from the vagotonic manifestations, which evidently were related to the dysthyroidism. The method was considered of course as palliative. The very evident relief obtained from it at each attack was too striking to ignore its usefulness, and the patients applied it very skilfully. They learned the details of the manipulation and had recourse to it promptly in the early phase of each attack. The relief consisted of a diminution of the tachycardia, of a lessening of cardiac compression, of a decrease of respiratory movements, which always accompanied the attacks in an exaggerated manner.

One case of tremor was observed in a middle-aged man who was addicted to the use of alcohol in a periodical manner. After an excess the tremor would become markedly increased and last from two to three weeks. Ocular compression during that period without any medication and practiced several times a day considerably diminished the intensity of the tremor and shortened the period of the usual increase: while formerly it lasted from eight to twenty days, with ocular compression the tremor would disappear at the end of two or three days. The beneficial effect of the procedure was self-evident.

A young girl of nineteen suffered from various phobias, particularly from fear of becoming insane. One of her sisters was committed to an institution and her father had outbreaks of depression. She was employed as a bookkeeper and worked with great application. She suffered frequently from headache, and when the latter became intense there would be also dizziness. It is the latter symptom that led her to the idea of "losing her mind." She read a good deal on the subject of mental disorders in popular books. In view of the family history she developed the above

mentioned phobia. Every time the headache and dizziness would make their appearance, the patient would be thrown into a state of panic, her heart would palpitate with great rapidity, and the patient would feel oppressed. At that juncture ocular compression was resorted to, not with the expectation of removing the severe headache, but of relieving the tachycardia. Each such an attempt proved to be successful. The decrease of the heart-beats was from 120 to 86, and later to 72. The psychic effect of the latter improvement was very satisfactory, as it enabled the patient to remove the idea of an existing cardiac affection which she entertained for a long time prior to the use of ocular compression.

The oculo-cardiac reflex is a new acquisition in nosology. In a number of instances it has an important diagnostic value. Its presence or absence may sometimes lead to the recognition of a serious malady in its early phase while other symptoms are still absent. The lesion may be localized in any portion of the reflex arc from the ocular branches of the trigeminus through the medulla as its center, and ending with the pneumogastric or sympathetic nerves. The degree of intensity of this reflex is also an aid to the diagnosis. Finally the therapeutic value of the reflex is self-evident. It is true that the relief obtained during the procedure of elicitation of it in tachycardia and other non-organic disorders may be of psychic origin, nevertheless the improvement is so manifest that its application is not only warranted, but also indicated.

The Treatment of the Various Types of Nephritis

(A Clinical Lecture Delivered at the Jefferson Medical College Hospital, Philadelphia)

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I am presenting to-day for your consideration three cases, each of which represents a type which you will not infrequently meet with in practice. I would call your attention, first of all, to the fact that in only one of them is the word "nephritis" justifiably employed, except it be that its employment has been sanctioned by usage; namely, the condition of a patient who is really suffering from an acute inflammation of the kidneys or true nephritis, whereas the other two patients are suffering from degenerative changes which are persistent, practically incurable, and characterized by manifestations which are peculiar to each of them.

The first case is that of a young man who is suffering from a toxic nephritis not due to the digestion of a poison, but to the development of some toxic agent in his body apparently arising from a severe attack of bilateral tonsillar infection. As he did not come under observation while the acute tonsillar process was in existence, we have had no opportunity of determining the kind of infection from the bacteriological standpoint, but he states that he was perfectly well until he had this attack of tonsillitis, and that the symptoms which he now presents developed as the tonsillitis approached its close. He is passing less than 12 ounces of urine a day, which is heavily loaded with albumin, and contains hyaline and fine granular casts; but more important still the urine under the microscope shows red blood cells attached to casts and also free. There is, however, no hematuria that is observable to the naked eye. There is considerable pallor, some puffiness under the eyes, but no general anasarca. The second sound of his heart is slightly accentuated.

Two questions arise in connection with his case: One, as to the prognosis; and two, as to the treatment. In these cases one

has to be most cautious as to prognosis. Like every other acute inflammation, it may pass away and the kidney may be restored to normal function within a comparatively short space of time. Before it has started on the way to recovery, however, the inflammatory process may become so severe as to result in the development of uremic symptoms with almost complete suppression of urine, and this acute complication may make his state desperate.

So, too, in some of these cases the kidney only partly recovers from the acute inflammatory process and the foundation is laid for a low-grade degenerative change which, possibly, will not develop into a serious state for many years or until some infectious disease once more throws a strain upon these eliminating organs.

When we turn to the question of treatment, in general terms it may be said to consist in masterly inactivity so far as drugs are concerned.

By means of the lantern I show you cross-sections of a kidney suffering from acute nephritis. You notice the changes which have taken place in the Malpighian tufts, in Bowman's capsules, and throughout the entire kidney. Not only is the organ itself swollen, but its cells are swollen, freely desquamated, and fill Bowman's capsules and the uriniferous tubules, so that even if urine was secreted the question would be, How could it find its way to the pelvis of the kidney? In other words, the profuse proliferation of cells prevents secretion not only because secreting cells are destroyed, but because cast off they induce a mechanical block.

When you stop to consider the matter you can readily understand that we have no drug which, taken into the body, can displace these cells or immediately produce new ones to take their place. Recovery will occur, if it occurs at all, by the two processes carried out by nature: one, the removal of the cells which have been destroyed by the inflammatory process as well as the removal of the exudate produced, and the other is the growth of new cells to take the place of old ones. To employ diuretics is manifestly useless. The best thing for the patient is to permit the inflamed organs to have rest, and this rest is to be obtained by the avoidance of renal stimulation, by the avoidance of too free ingestion of water, and by absolute rest of the body so that there may be a minimum of tissue waste to be eliminated. The old-fashioned, but nevertheless somewhat effective, plan of applying two or three dry cups over each kidney may be resorted to with the hope that it will diminish congestion. If the lungs are perfectly clear, a hot pack may be given every day or every other day, not so much with the idea that the sweating induced will eliminate impurities through the skin as with the conception that it will draw blood away from the congested kidneys and equalize the circulation. If the general hot pack seems oppressive, it may be limited to the middle zone of the body, the hot wet blanket being wrapped around an area bounded by the ensiform cartilage above and the pubes below. The diet should be largely if not entirely a carbohydrate diet, the various starches which are easy of digestion and assimilation being used, and their digestion hurried by adding to them five or six grains of taka-diastase at each meal. It has often seemed to me that the administration of diuretics in these cases was as unwise as is the administration of expectorants during the acute stage of lobar pneumonia. In the latter case the air vesicles are filled with exudate. In the acutely inflamed kidney a similar mechanical condition is present. Here we have an instance where a masterly inactivity in regard to drugs requires more skill than their free administration; in other words, except for the purpose of meeting complications, our motto should be "Let the patient get well."

The second case would ordinarily be called one of parenchymatous nephritis. You notice that the patient is pallid and puffy looking, and that the edema from which he suffers is not limited to the lower extremities, as it often is in cases of ruptured compensation in cardiac disease, but

is almost universal. His urine also contains a very large amount of albumin and many large granular casts. It is below 16 ounces in twenty-four hours. He gives a history that he has been in failing health for six months, but we fail to develop in his history any acute cause for the beginning of his illness. If we could see his kidneys, they would not be red and hyperemic, but would present the picture which is known as the "large white kidney." Here again we would find the secreting portions of the kidney covered with desquamated degenerated cells and many of Bowman's capsules tightly packed with such cells. In such cases the prognosis is not only bad as to ultimate recovery, but it is bad as to the duration of life, since few men presenting the conditions that he does live longer than a year or eighteen months, dying as a result of some intercurrent illness, which attacks them because of their devitalized state, or from uremia, which is associated with complete suppression of renal function. The second sound of his heart is distinctly accentuated and his blood-pressure is about 160 systolic and 110 diastolic. Here again the administration of diuretics must be carefully considered. The free administration of water in the majority of instances does harm rather than good. You cannot expect organs which are incapacitated to eliminate fluid which is swallowed in excess. Only those amounts of water which are necessary to compensate for loss through the lungs and skin and a limited loss through the kidneys are indicated. Large quantities tend to increase anasarca and to induce pulmonary edema.

Many of these patients come to the physician because some acute exacerbation of their condition is the first sign that they have of trouble; in other words, an acute congestion or inflammation is superimposed upon the chronic process already in existence, and this complication wipes out the function, in part or completely, of those portions of the kidneys which are still capable of functioning. Such occurrences account for some of the short illnesses followed by death which are met with in these patients. The kidneys working upon a narrow margin of safety as soon as they are temporarily impaired by some acute condition precipitate catastrophe.

These conditions too explain why some patients who are apparently exceedingly ill take a turn for the better and rapidly improve as far as their acute manifestations are concerned. In other words, if they survive long enough for the acute process which has been superimposed upon the chronic one to clear up, they may revert to their primary condition and often no one can determine what course is going to be followed in a given case. Here again we should remember that an inflamed organ needs rest, not stimulation. You can no more force such a kidney to function actively by the use of diuretics than you can force a consolidated lung to respiratory interchange by forced breathing.

Here again the use of hot packs, as already described, and the employment of moderate doses of sweet spirit of nitre, to keep the skin active, with rest in bed and a meat-free diet during the acute exacerbation, are essential.

If the physician, after the passage of a number of days, concludes that there has been time for the acute complication and congestion to subside, he may decide that the use of some diuretic is wise. If so, it is usually best not to give the diuretic day after day, but to give it in fairly full doses for one or two days, and if it fails to act to wait for further improvement to take place in the kidneys by natural processes. On the other hand, if it does increase urinary flow, he is not to persistently continue it, but to give the kidneys a couple of days' rest before using the drug again.

We do not recognize as we should that the internal organs need periods of rest just as much as the muscles or brain need periods of rest if they are to functionate properly. Incidentally this holds true of the liver, which if it is stimulated every day will not do as well as if it is stimulated every few days to increased endeavor, and the liver is a very important organ to be considered in cases of renal disease because

it is the most important organ that we have in destroying poisons in the body and in performing other essential physiological functions closely associated with urea formation and still other important factors.

Often in these cases the use of 1/100th grain of nitroglycerin, instead of the sweet spirit of nitre, seems to increase urinary flow not because it stimulates the secreting epithelium, but because it probably dilates the renal blood-vessels, supplies the organs with a greater quantity of blood, and so permits increased secretion.

The use of the various potassium salts in these cases, both of acute and chronic parenchymatous nephritis, is rarely of value and if resorted to should only be employed for a day or two at a time. Diseased kidneys do not readily eliminate potash, and if it is retained it acts as a protoplasmic poison and tends to increase edema and cardiac depression.

The third case is one of so-called interstitial nephritis, and in this condition you remember that the prognosis is quite different, unless the symptoms are very acute, as to the duration of life. Many patients with interstitial nephritis live for ten or twenty years, the process being exceedingly slow and accompanied by a gradually increasing blood-pressure if hypertrophy of the heart occurs, as it usually does. Here again we have no remedy which will entirely arrest the pathological process, but dietary measures and guidance as to methods of life are exceedingly important. In the early stages, and indeed in the middle stages of the disease, there can be no doubt that keeping the blood-pressure within moderate bounds, but not necessarily as low as normal bounds, is wise, by the use of electric cabinet baths, the hot pack, or nitrites. So, too, in these cases the moderate use of the iodides is often advantageous. The patient should be urged to lead a gentle rather than a strenuous life, but unless an examination of his blood shows that it contains an undue proportion of non-protein nitrogen there is in my opinion no reason why he should be deprived of meat, and the old idea that white meats are less harmful than red meats is completely exploded.

In this connection I have to say a word in regard to the question of salt-free diet in both the acute and chronic forms of nephritis when dropsy is beginning or is present in marked degree. My view is that there is no justification in ordering a salt-free diet unless an estimation of the chlorides in the urine shows that the kidneys are unable to eliminate the chlorides and by their retention induce dropsy. We are learning more and more that in renal disease it not infrequently happens that one or more functions of the kidney are far more impaired than other functions. In one class of case we may find edema and retention of salt with a low non-protein nitrogen in the blood, and in another a high non-protein nitrogen in the blood with free elimination of water and salts.

There is not time to discuss with you the use of the various dye-stuffs like indigo-carmine and phenolsulphonephthalein in determining the functional activity of the kidney, but I would call your attention to the fact that while these methods are valuable they only form one stone in building up the arch whereby you make your diagnosis and determine your treatment. There are, undoubtedly, some cases in which the kidneys seem to maintain their ability to fairly well eliminate the dyes which are used to test their efficiency, and yet retain substances which they should normally pass out of the body.

Last of all, you will recall that cases of chronic interstitial nephritis differ from the other forms in that they are prone to have a polyuria instead of an oliguria, and, therefore, there is no need for limiting the patient's intake of water except to remind him that if he drinks excessively he will give his kidneys that much more work to do. The significance of nocturnal polyuria from which many of these patients suffer is that the disease has induced a high renal threshold, and during the night the patient's kidneys attempt by free elimination of water to carry out solids which during the day have been produced but retained.

Editorial

THE TREATMENT OF EXOPHTHALMIC GOITRE.

No disease has probably been treated by a larger number of operative procedures than has exophthalmic goitre, the treatment varying all the way from the injection of live steam, boiling water, and destructive agents, to ligation of arteries and excision of parts of the gland. There has always been a very considerable proportion of the profession, with large experience, who have insisted that a real rest cure, not a half-and-half one, is of infinite value in many of these patients, the great difficulty being that those of limited means cannot resort to it, and its carrying out in a general hospital is almost impossible.

It has also been admitted by most surgeons of experience that a period of rest in bed prior to operative interference is always desirable, and there is no question that the rest which is insisted upon by the surgeon after he operates is an important factor in the ultimate recovery of the patient. As a matter of fact we are rapidly coming to the view that the thyroid gland in exophthalmic goitre has to be treated in different ways, depending upon the individual peculiarities of the case rather than upon any standard proposition, because in no other disorder of function are the conditions of one patient so widely divergent from the conditions which may exist in another.

In a discussion which was recently carried on in the Clinical Section of the Royal Society in London by surgeons and physicians, we note with interest that no less a person than Leonard Williams stated his conviction that there was no more justification for operating on the thyroid gland than for operating on the kidneys in a case of diabetes, asserting that the worst symptoms of the disease, cardiac, mental, and nervous, were due not to the thyroid but to the thymus, to which too little attention had been paid in view of the fact that it was enlarged in over 85 per cent of the cases. In other words, he advocates that if either gland is to be attacked by the surgeon it should be the thymus gland.

Kinnier Wilson agreed with Leonard Williams that exophthalmic goitre is not a disease of the thyroid, and we quote these two speakers because doubtless their assertions will seem anything but in accord with the views that are generally held by the profession, relying upon our readers to give them the value they deserve.

On the other hand it is interesting to note that Hector Mackenzie stated that at one time he had been of the opinion that surgical treatment in certain cases was probably the best one that could be resorted to, but later on he became disheartened by the total mortality. Still later when operations on the gland were treated with the aid of local anesthesia he once more revised his position because the results seemed to be as good as they formerly had been bad. He disagreed with those surgeons who advocated ligature of the arteries, not because he thought this procedure was particularly dangerous, but because he had never seen any satisfactory results, and he considers that if operation is going to be undertaken it is not worth while wasting time tying arteries when far better results can be obtained by thyroidectomy.

Concerning the use of the *x*-rays, which are now so popular in the treatment of this condition, Martin Berry spoke of them in high praise, believing that few conditions contraindicated their use except where there was great pressure upon the trachea with nervous dyspnea. Mackenzie, however, while recognizing that the *x*-ray advocates have ground for their contentions as to the valuable effect of the *x*-rays, maintains that many instances in which the

x-rays do good are not well developed, but more in the nature of quiescent cases.

Last of all, from the surgical standpoint, it is interesting to note that Dunhill expressed the view that in those cases in which ligature of the arteries could be done easily it was not necessary, and that in cases in which it might be regarded as quite necessary it was dangerous, believing that under the latter circumstances it was about as easy and safe to remove part of a lobe.

We think that Dunhill possibly sums up the whole subject pretty well when in closing he expresses the belief that there should be only one person in charge of a case of exophthalmic goitre, and this person should be the physician piloting the patient back to health if possible, but in turn calling in the surgeon if it is found that the case is not going on as it should. Generally the surgical procedure to be followed, the nature of the anesthetic, and the extent of the gland to be removed should be determined, of course, by the surgeon who is called in to do the operation, to which we may add the additional statement that whenever possible the surgeon that is called should be one who is skilled in judgment and in technique, by virtue of experience, in this class of cases.

THE PROGRESS OF CLINICAL PHYSIOLOGY.

Those members of the profession who have achieved even a moderate degree of success are forced by reason of the demands made upon their time to give up original investigation if they are active practitioners and to rely upon the results achieved by their more fortunate colleagues who, for one reason or another, are able to devote their time and energies to the development of pure science in its relation to medicine.

For many years, largely because of government subsidy, a large proportion of the results of such work emanated from Germany, but within the last two decades the establishment of laboratories in England and America has resulted in the development of an immense amount of original research which promises to be of untold value to medicine and the world in general. Indeed, at the present time, both in this country and in England, there are groups of men who have been so fortunate as not only to delve in the realm of advanced medical science with success, but who have had a sufficient breadth of vision to enable them to place their results before their active medical colleagues in a way which proves interesting and valuable. Not the least of these is J. S. Haldane of Oxford, who has contributed to the *British Medical Journal* an address which he delivered before the Edinburgh branch of the British Medical Association. In this address he deals with some recent advances in the physiology of respiration, renal secretion and circulation, acknowledging the assistance, directly or indirectly given him, by a number of other men working along collateral lines.

In discussing the physiology of respiration, he lays emphasis upon the wonderful delicacy of balance which controls this function, pointing out that although a graphic record of his breathing as he spoke would present a picture of hopeless irregularity in every direction, he also emphasized the fact that if the air expired was collected minute by minute, it would be found that the samples varied little in composition. In other words, that breathing is natural in the sense that if it is not interfered with, the mean percentage of CO_2 in the alveolar air is maintained with extraordinary steadiness; far more steadily than in the expired air, because the latter is a mixture of the alveolar air with the air contained in the air-passages as expiration begins. If CO_2 is inhaled or moderate increases in its content induced by muscular exertion, he also found that its quantity in the alveoli was increased only momentarily because the breathing was immediately increased sufficiently to maintain the average CO_2 per cent. This also held true if oxygen was inhaled; in other words, the alveolar content of CO_2 is always kept comparatively at one level, and this level is closely allied with the quantity of CO_2 in the blood stream as it exists in the lungs. The result is that

the CO_2 stimulates the respiratory center to activity, increasing its activity as the CO_2 content rises and diminishing it if the reverse holds true, thereby establishing a perfect balance. To illustrate the extraordinary delicacy of what might be called the respiratory reflex, it has been found that an increase or decrease in the free CO_2 content in the ordinary blood is only two parts by weight in a million of blood.

The interest in the function of CO_2 in the body, however, does not cease here. It will be recalled that Pembrey and Beddard found that in diabetic coma the alveolar CO_2 percentage falls to less than one-third of normal, but returns to normal when the symptoms are relieved by sodium bicarbonate, which is, of course, indicative of the fact, as Haldane says, that CO_2 in conjunction with other acids acts in the regulation of breathing.

Combining the researches of Hesselbach and their own, Haldane and his colleagues have been able to conclude that the reaction of the blood is regulated with a delicacy which is almost inconceivable, since their calculation shows that deficiency of one part by weight of ionized hydrogen in about one million millionth part of blood suspends completely the activity of the respiratory center. It is evident, therefore, that some compensatory mechanism must exist for the control of so delicate a process, and this is obtained by the immediate response of respiration.

Recently Dodds has shown that when food is taken into the stomach there is a rapid secretion of dilute HCl, followed about an hour later by an alkaline secretion from the small intestine. The secretion of HCl results in a temporary excess of alkali in the blood, and this promptly produces a quite marked compensatory rise in the alveolar CO_2 percentage, followed about an hour later by an equally marked fall while the alkaline secretion is being produced. In other words, there is interplay between the digestive and the respiratory functions.

Another point of very considerable interest is that while the urine may vary extraordinarily in its reaction, the alkalinity of the blood varies scarcely at all, the acidity of the urine being chiefly due to the presence in it of acid phosphate, large amounts of which can be excreted without the urine becoming more than slightly acid.

In connection with the regulation of oxygen pressure in arterial blood, Haldane also points out that the mechanism involved is an exceedingly delicate one and reminds us that Pembrey was the first to show that Cheyne-Stokes breathing in a patient can be abolished by the administration of oxygen, which would seem to be equivalent to a statement that Cheyne-Strokes breathing is always a symptom of want of oxygen. Meakins has emphasized the importance of slight variations in the oxygen content of the blood by pointing out that a continued deficiency of even one part by weight of free oxygen in a million of the blood present in the capillaries may be very dangerous.

Of definite clinical interest is Haldane's description of what he calls the anoxemia of bronchitis, pneumonia and emphysema, and ruptured cardiac compensation. It is in these conditions that he seems to be a hearty believer in the free administration of oxygen-gas by inhalation. It is also interesting to note in this connection that although the lungs are quite as much blocked at the time of crisis in pneumonia as they have been at an earlier date, nevertheless the breathing improves as crisis occurs.

In connection with renal function, Haldane points out that the free drinking of water, while increasing the output of urine, does not materially increase its solid constituents. Furthermore, after free water-drinking, there is no change in the hemoglobin percentage, which is noteworthy, nature taking care that the amount of water absorbed is equaled by the amount of water which is excreted. In other words, the body maintains the water content of its blood with almost the same delicacy as it maintains the CO_2 content, and in those forms of kidney disease in which the ability to excrete salts is impaired, the water is not retained in the blood stream, but in the tissues for the purpose of maintaining their proper tonicity as well as the normal tonicity

of the blood. In some instances there may be dropsy because more fluid is taken in than the water-eliminating power of the kidney will permit it to get rid of, and in other instances it is the inability of the kidney to eliminate salts which produces the general anasarca.

Last of all, Haldane calls attention to the investigations of Krogh of Copenhagen, who found that by microscopical observations of transparent tissues very large areas of capillaries are tightly closed so that no blood or even plasma can pass through them. During activity, however, these capillaries relax and become permeable, thereby carrying an increased oxygen supply to the parts which are active, and recent work in this country, done by Richards, shows that a similar play of capillary activity takes place in connection with the circulation of the kidney, which is equivalent to stating that nature arranges for organs or parts of organs to go into periods of rest alternated with periods of activity, in which, because of their rest, they are enabled the better to functionate.

TOBACCO AND THE HEART.

Physicians are so frequently asked the question as to whether smoking is to be considered harmful that any contribution as to the influence of tobacco when so used is of interest, even if wide divergence of opinion still exists concerning its influence. We believe that a census of the medical profession would reveal the fact that a very large proportion use the weed, and while this is no proof that it possesses no harmful properties, nevertheless its influence cannot be exceedingly harmful or its consumption would not be so popular.

One of the difficulties at arriving at a correct conclusion depends upon the constitution of the individual and upon the question as to whether he uses tobacco to excess, excess in turn being determined by the susceptibility of the individual and the strength of the tobacco which is employed.

If tobacco was as deleterious as some fanatical people believe, an amount of ill health would be engendered which would be quite sufficient to discourage its employment. It has been claimed by some that it should not be used by those who have an abnormally high blood-pressure on the ground that it raises blood-pressure. By others it has been asserted that it induces functional disorders of the heart, by still others that it causes nervous irritability, and some have even gone so far as to claim that it induces an actual degeneration of the myocardium.

It is interesting to note that most of the contributions to this subject have been made by those who do not use tobacco and who often have been instigated by fanatical antagonism to it. We know of one or two investigations which have been made by others, and they have not, for various reasons, had a sufficiently close connection with the actual smoking of tobacco to have a very definite bearing upon the issue. As in many other instances, experimental results have been misinterpreted or conclusions reached which are not justified by the researches which have been made.

The latest contribution which we have seen has recently been made to the *Ohio State Medical Journal* by Brigham, who carried out an investigation with 132 students at the University of Michigan. Dr. Brigham found that the blood-pressure did not vary much from normal in any class of smokers, thereby opposing the view which we have already referred to, to the effect that it tends to raise blood-pressure. He did find, however, that smoking tobacco increased the pulse-rate, bringing it up to the neighborhood of 90 per minute, and he also states that the length of systole was slightly shorter among smokers than among abstainers. He deduces from this that the drug produces a slight irritation of the myocardium in young men who should have been in the most perfect condition of health.

We see no reason to believe that this is a true deduction. It is quite possible, and, indeed, more probable, that the increase in rate is due to some diminution in activity of the pneumogastric nerves or that it has resulted from a slight relaxation of the

vascular system, whereby the resistance to heart action is diminished, and we cannot help feeling that this author makes a mistake when he goes so far as to conclude that tobacco smoke may be considered an etiological factor in myocarditis.

In the second series of experiments, Dr. Brigham says that the striated muscles of frogs subjected to tobacco smoke fatigued much more rapidly upon electrical stimulus than the muscles of control frogs, and this was not due to the presence of carbon monoxide in the smoke, but to other toxic substances. Here again we do not see that this experiment, however interesting it may be in itself, has much bearing upon the use of tobacco by the human being, whose muscles at no time are exposed directly or indirectly to an infinitesimal amount of tobacco smoke, and it is a far cry from the muscles of a cold-blooded animal to the muscles of man.

The question naturally arises as to whether something may be said in favor of tobacco smoking. When immense numbers of the human race, scattered all over the world, employ any agent constantly in large quantities, and when these human beings vary from those possessed of the highest intelligence to those who are but poorly endowed mentally, it is a fair supposition that the substance which is employed, while it may occasionally be harmful, nevertheless possesses advantages and usefulness. We believe that a large number of those who smoke tobacco find in it rest and comfort, and that this rest and comfort, which may be entirely psychic, tends to lower blood-pressure when it has been raised by severe mental or physical toil.

In some instances the mere act of smoking steadies the processes of thought and by inducing mental rest permits the system to direct its chief energies to the digestion of food, instead of having its energies divided between mental and physical activity on the one hand and digestive processes on the other.

A favorite method of criticism resorted to by the opponents both of alcohol and tobacco is to state that these substances induce certain changes in the human body, and then to reach the deduction that because these changes occur they are abnormal or harmful. It is a much more reasonable line of argument to hold that the induction of certain functional changes at certain times is definitely beneficial. In the case of alcohol, it may be proved that its use in moderate quantities at times, or constantly, diminishes the ability of an individual to do mental work at the top notch, but this does not prove that it is not advantageous for him to use in moderation a substance which will prevent him at suitable times from continuing to work at top notch.

It was pointed out many years ago that the physiological explanation of the universal habit on the part of babies of sucking the thumb rested upon the fact that by so doing they drew off energy from the vagus centers and so quickened the pulse-rate. So far as we know, such movements on the part of a young infant have never yet been claimed to be deleterious, and while it may be held that the infant uses the thumb as a substitute for the nipple, we believe it can be equally well held that it would be found to be a very poor substitute if the infant did not find a certain amount of comfort in its employment.

We believe that the truth of the whole matter lies in the question as to whether tobacco is used excessively and, in certain instances, wrongly in the sense that it is employed at times when it should be laid aside. Tens of thousands of persons have been deprived of red meat and allowed white meat under the belief that the first was deleterious and the second harmless, although we now know that any such distinction is absurd, and that in many instances of renal disease there is no reason whatever why they should be deprived of any kind of meat, but many reasons why they should be allowed to use it in moderation in order to maintain a nutritional balance. So, too, not rarely tobacco is forbidden a patient when there is really no good reason for depriving the patient of what is a comfort to him.

THE USE OF PITUITARY EXTRACT.

Many years ago when adrenalin, because of its remarkable effects, was attracting the attention of the entire profession, we pointed out in these columns that it was inconceivable for a substance which possesses real power for good not to also possess real power for harm if wrongly employed. The same statement holds true in regard to pituitrin, a substance which, like adrenalin, has undoubtedly become a permanent factor in the materia medica list. Without doubt it is often wrongly employed, and when so used, as it possesses power, it is capable of doing harm, but here the weakness lies with the person employing it and not with the drug itself. It is manifest that to use pituitrin in a case of labor before the os is adequately dilated, or when there is some obstruction in the birth canal, is distinctly dangerous. The reported cases of ruptured uterus under these circumstances is a testimony to the power of pituitrin as a uterine stimulant and not evidence that the drug is dangerous unless used in unsuitable cases.

So, too, with our present lack of knowledge concerning its influence upon the other glands of internal secretion, occasional instances in which its hypodermic use is followed by disagreeable nervous or circulatory symptoms is but another indication of its power and another evidence of the fact that we do not know enough concerning it to employ it haphazard.

Its use to hurry a labor, which nature is making slow in order to avoid damage to the mother or child, is wrong, whereas on the other hand its employment in true uterine inertia in a tired woman with a free birth canal may be exceedingly useful.

Without doubt its introduction has caused many a physician to avoid the use of forceps, and considering that oftentimes these instruments cannot be used by skilled hands and, therefore, often do damage to the mother or child, it is a nice question as to whether the employment of pituitrin even in cases, which are not best suited to its use, in the end does not do less damage than forceps have in the past.

The whole point in this matter is controlled by the facts stated in our first sentence, namely, that no drug that possesses great power can be used haphazard, but must be employed only when clearly indicated and when the contraindications to its use are practically naught.

We understand that in certain cases when it is thought that a perineal tear may be induced by pituitrin skilful obstetricians now perform episiotomy followed immediately after birth by suture.

NON-OPERATIVE TREATMENT OF SURGICAL TUBERCULOSIS.

After a period of enthusiasm for the surgical treatment of tuberculosis involving bones, joints, glands, or other accessible structures, there has come one of reaction in which even the active surgeon, warned by often tragic experience, has withheld his hand until such time as, for instance, the pus under tension has forced him to procure a mechanical relief to local circulation even at the risk of a possible mixed infection.

The advocates of non-operative measures have year after year been strengthening their position by reports of successful cases. Gauvain (*Lancet*, May 21, 1921), confining his remarks to tuberculous disease of the bones, joints, and glands, in which conditions he states non-operative treatment may be adopted with confidence and reasonable assurance of success, reports on a series of cases observed from 1908 to 1921, this series numbering between 2000 and 3000. Gauvain holds that operative treatment of an active tuberculous lesion is based on a false pathology, except in the cases in which the lesion occurs in a situation where its presence is incompatible with life. A tuberculous lesion provokes a reaction. There is the formation of a zone of resistance about the focus of disease. It appears reasonable to reënforce this natural defence and to diminish the virulence of the attack

of the bacillus and to limit in this way its progress.

In 1908 Sir Anthony Bowlby demonstrated in the clearest possible manner the undesirability of radical treatment in tuberculous disease of the hip-joint when he delivered an address at Nottingham on 900 cases treated at the Alexandra Hospital, with a mortality of less than 4 per cent. His brilliant record was only possible by abstention from major operations in active tuberculous disease and aseptic technique in such minor operations as were indicated.

One point of great importance came out clearly: "tuberculous joint disease is arthritis occurring in a tuberculous patient, and is not merely a joint affection." This is the key-note of, and justification for, non-operative treatment of surgical tuberculosis. It needs the greatest possible emphasis, for even to this day there is too great a tendency to concentrate unduly on the local lesion and disregard the fact that the patient himself has contracted a general disease, of which any particular lesion or lesions are merely local manifestations.

Pure surgery still plays a part in the treatment of bone, joint, and gland tubercle, though in cases of active disease a continually diminishing part.

It is often justifiable to extirpate the smaller tuberculous lesions; operation is occasionally permissible in such conditions as tuberculous disease of the knee-joint in adults where progress by conservative measures is slow and the time factor is of importance; it may be essential for the saving of life under increasingly rare circumstances in almost any situation of the body. It is again indispensable in the correction of ankylosed or other deformities where faulty treatment has permitted such deformities to arise—*e.g.*, a hip-joint ankylosed in a bad position. It may be called for where faulty technique has resulted in secondary infection. But no striking advance has been made in the operative treatment of acute tuberculous bone and joint disease unless bone-grafting of the carious spine be considered as such. That operation is, however, essentially a conservative measure. No attempt is made to deal with the lesion which calls for such an operation. It is simply an internal method of splinting the spine, designed as a substitute for the instrument-maker's skill. In the majority of cases it is an unnecessary operation provided reasonable facilities are available for treating the patient; in certain cases it has distinct and considerable dangers; in a limited number of cases it presents certain advantages. It possesses one point in its favor in that it is a conservative operation; it is a tangible if tardy recognition of the fact that to immobilize a tuberculous lesion is a better way of promoting healing than to attempt its extirpation; but with increasing appreciation of the value and utilization of properly applied conservative treatment the indications for the performance of this operation should be greatly reduced, to the advantage of the patient.

The psychology and future well-being of the patient have been neglected, yet no one would deny their importance. A normal, healthy, well-cared-for, suitably occupied child is a happy child. He is given full play for natural healthy mental and physical activities. Conversely, it is of obvious assistance to the patient to make him happy and normal, and all means to that end should be encouraged and utilized. The monotony of immobilization, of long-enforced recumbency, of fixation in unnatural attitudes, cries for alleviation.

All child patients should be educated, and manual instruction should play a large part in the scheme, adolescents trained in work suited to their limitations, and adults occupied. In addition, all should be amused and entertained, and shown how to amuse and entertain themselves.

In any comprehensive scheme for the treatment of surgical tuberculosis prevention should play a much greater part than hitherto.

Much more should be done than is being done for the child with the stigmata of tuberculosis, the pretuberculous child, the offspring of tuberculous stock.

Conservative treatment includes consideration of general treatment, involving climatic, hygienic, dietetic, drug, educational,

and other methods which it is desirable to employ, and local treatment, which is concerned with the correction or prevention of deformity and is largely orthopedic in character but subject to those limitations enjoined by the fact that the patient is tuberculous.

As a rule, to which there need scarcely be any exception, tuberculous abscesses secondary to disease of the spine, hip, or, indeed, any of the larger bones or joints, should never be opened. Neither should they be left in the hope that they will be absorbed. As soon as possible after their formation and as early in their evolution as the skill of the surgeon permits they should be aspirated. Occasionally their aspiration may be assisted by the employment of modifying fluids.

Adjuvant methods of treatment have largely increased in relative importance and scope of application in recent years, and represent perhaps the most interesting advances made in the non-operative treatment of surgical tuberculosis.

Amongst such aids are heliotherapy, balneotherapy, chemotherapy, vaccine treatment, and the therapeutic employment of *x*-rays and other electrical agents. Auxiliary methods are of importance for the patient's general well-being, and are also often directly concerned with his disease; they comprise attention to the teeth, skin, throat, nose, ears, and eyes. These matters are frequently neglected, but demand attention and skilled care. The author also includes under auxiliary methods of treatment a branch institution such as he is fortunate in being able to make use of, where chronic cases not requiring any special treatment may be detained indefinitely, and thus give room at the hospital for more acute patients urgently needing specialized care.

All patients who have suffered from surgical tuberculosis should have the continued advantage of occasional skilled supervision. No special hospital for the treatment of these conditions can be considered complete unless it possesses an out-patient department where discharged patients may be periodically examined, advised, and assisted. Not only is medical help required, but advice in the choice of occupation and assistance in obtaining suitable employment should be forthcoming. Associated with this department facilities are necessary for sending patients to open-air camps and holiday homes working in conjunction with, and under the management of, the parent institution.

The analysis of 2487 cases shows that 1931 were arrested, 62 improved, 31 unimproved, 123 removed or transferred, 56 died. The proportion of septic cases admitted was, unfortunately, a high one. The majority of those discharged unimproved were septic cases. By "disease arrested" is meant that the disease appeared to be cured, abscesses were absent, sinuses healed, and the patient fit to return home and resume ordinary life.

The mortality percentage was 2.54; of the spine, 3.39; of the hip, 1.71; excluding patients who died from intercurrent disease, the number of deaths directly due to tuberculosis is reduced to 47. Meningitis is the commonest terminal cause of fatality. Spinal caries is not only the commonest, but also the most fatal form of tuberculosis. Ten of the thirteen patients suffering from spinal caries who died from meningitis were under the age of five years, and in many cases death occurred within a comparatively short time after admission. Surgical tuberculosis is more difficult to treat and more likely to produce physical disability and undoubtedly more fatal in the very young than in older children.

SPECIAL FIELD OF NEUROLOGICAL SURGERY.

After some preliminary remarks, admirably worded and based on a sound philosophy, bearing upon the development of this specialty and its relation to the profession of medicine, Cushing (*Ohio State Medical Journal*, May, 1921) takes up in detail some of the questions of neurological surgery to which he has devoted himself in the last ten years.

As to neurosurgical technique, he observes that perfection in the conduct of his

therapeutic measures is as essential for a surgeon as is the technique of laying on colors for an artist or of producing sound for a musician. The most crying need in the early years of this century was for the improvement of our technical methods under the realization that what had sufficed for other organs and tissues, when applied to the surgery of the nervous system was disastrous.

When the idea of a purposeful decompression over relatively silent portions of the brain, conducted, moreover, in areas like the temporal and suboccipital regions where an undue extent of protrusion is checked by securely closed extracranial muscles—when this idea finally took hold, the old explorations which had resulted in a certain measure of relief were resurrected and tabulated as decompressions in our modern sense, which they were not, either in reality or intent.

With the development of a reasonably safe and satisfactory procedure for relieving tension both for cerebral and cerebellar lesions, and one which of itself did not lead to paralyses, these palliative operations began to multiply, and it soon became apparent to all that the accepted views regarding the cause of what was called optic neuritis, resulting in atrophy and blindness in tumor cases, would have to be revised.

The subtemporal and the suboccipital operations are, in the long run, the two most useful procedures in craniocerebral surgery, though, as is true of all operations, they are by no means perfected, and there are right and wrong ways of performing them.

The subtemporal decompression may be employed as a temporizing measure even in the presence of a localizable lesion, but it is of chief value in all unlocalizable cerebral tumors. Naturally, since the bone defect is purposefully made over the relatively silent temporal lobe, the growth may at times be unexpectedly disclosed. In the presence, moreover, of a questionable cerebellar lesion, the existing symptoms being hardly such as to justify the more elaborate and difficult posterior exposure, the measure may be used as an aid to diagnosis. For the existence of an obstructive hydrocephalus can be determined under these circumstances by a puncture of the temporal horn of the lateral ventricle, a matter of considerable localizing value, though it is to be admitted that in the presence of a hydrocephalus a decompression over the cerebrum gives but slight pressure relief.

The routine operation which may be regarded as of second importance is the combined osteoplastic exploration and decompression. With the bone flap so placed that its base is in the temporal region, the squamous wing of the temporal bone may be rongeured away after the flap is reflected. Though surgeons in the past have sacrificed without hesitation large portions of the calvarium in eradicating tumors, and occasionally this may be necessary even now, yet it is highly desirable that the cranial chamber should be kept as intact as one's skill and the conditions permit. It is also desirable for many reasons that an operation for tumor should be conducted whenever possible in a single session; the old two-stage performances, provided there is careful blood-stilling, are less frequently called for.

The third procedure, the typical cerebellar exposure, is a still more difficult operation and necessitates elaborate preparations and skilful team work if a long series of these measures are to be carried through with a minimal mortality. In this performance the steps are practically the same, whether it resolves itself into a decompression or in the more or less complete removal of a tumor, should one be disclosed. It is a long two-hour operation at best—an hour for the full exposure and another for wound closure—but when tension is great, when there is threatened respiratory difficulty so that a ventricular puncture in the course of the early stages is called for, or when there is a recess tumor which requires long and careful manipulations, or a tumor of the midline which necessitates removal of the arch of the atlas and prolongation of the dural incision down over the spinal canal as far as the axis, the performance may well require an extra hour or two.

There is no field of surgery in which fastidiousness is more essential to success. Imperfections in technique in the course of operations on other parts of the body, where other tissues than those of the central nervous system are concerned, may delay recovery but not necessarily impair an end result. But corresponding slips which compromise the function of the nervous system may sometimes leave mental or other disturbances which are irrecoverable and to which death is preferable.

It is not the number of cases operated on which have made advance in surgery possible, but the detailed and careful analysis of the few, in conjunction with allied laboratory investigation.

Ten or more goitres or hernias treated, or appendices removed, in a morning is not an uncommon record, but none of them is completed in a thoroughgoing sense by one person; the chief surgeon may spend but a few moments at the task—the more essential moments to be sure, and it is remunerative—but it puts him on the basis of that form of specialist whose sole task is to give the final adjustment to the carburetor as a succession of newly-assembled motor cars pass him.

Cushing states that brain tumors are common. Of 182 patients admitted in a consecutive twelve months' service to September 1, 1920, with a diagnosis of presumptive or possible tumor during this period, 54 were not operated on.

The remaining 128 patients were operated on in 160 sessions with sixteen fatalities, giving an operative mortality of 10 per cent, a case mortality of 12.5 per cent, and a mortality of 15.5 per cent for the seventy-seven patients for whom a tumor extirpation, partial or complete, was attempted.

Concerning pituitary disorders Cushing observes that certain practitioners calling themselves endocrinologists have erected an extraordinary structure of symptomatic complexes based on meager facts and a fervid imagination, nor does there seem to be any way of checking these elaborations, which bear about as much relation to the functions of the ductless glands as did the phrenological imaginings of Gall and Spurzheim to cerebral localization, and further states that epidemics of this sort from time to time hysterically sweep over medicine, dying out in due course, the more quickly if unmolested.

Cushing believes that when there is a primary pituitary adenoma with enlargement of the sella and signs of implication of the chiasm, the operation of choice is the transsphenoidal one. Properly conducted it is an operation of comparatively low mortality, convalescence is a matter of a few days, and the results are often brilliant for restoration of vision—the main object of the operation—which may be astonishingly rapid. It is not an operation likely to be repeated with equal success in case the adenoma continues to grow rapidly or has already broken down the dural barriers and invaded the cranial cavity. Under these circumstances if the operation is to be done at all it must be from above if there is to be any prospect of preserving or restoring vision. It is very doubtful, however, at an early stage of a primary intrasellar adenoma when the conditions are favorable for an operation through the nose, whether patients should be urged to, or would be willing to, submit to an operation from above, with its admitted high mortality and likelihood of complications. For it is accompanied by a wide exposure of the brain, whose cortex may suffer injury, as may indeed the chiasm itself, and the operation furthermore opens the dural barriers so that further enlargement of the growth finds ready access to the region we would wish to protect.

With primary infundibular tumors surmounting, as they often do, a small sella of normal proportions, the problem is entirely different. Cushing favors, with some modifications, the unilateral osteoplastic frontal operation. In the thirty-four patients with operations of this type (forty-three in number) there have been only two fatalities, the second and third cases. However, in only seventeen of the thirty-four patients was the lesion disclosed, and it could not be satisfactorily dealt with in all of them. In 50 per cent of the cases, therefore, the nature of the lesion remains uncertified.

Progress in Therapeutics

Medical Therapeutics

Water Treatment of Diarrhea in Infancy.

DONNELLY in the *New York Medical Journal* of August 3, 1921, points out that dehydration in infants is shown by the sunken fontanel, the ashen hue of the skin, the receded eyeballs, and oliguria. He says: This state of dehydration calls for immediate replenishment of water in the infant's body. In the absence of vomiting, and if the dehydration is only slight or beginning, water by mouth usually suffices. When the infant will take water from a bottle or off a spoon, four to ten ounces daily (according to age) between feedings will maintain the water balance. If this method is not practical, water introduced by a nasal tube into the esophagus offers advantages in that it is painless and devoid of danger or of unpleasant after-effects, with the possible exception that irritation of the nares and nasopharynx may occur after the repeated use of the nasal tube. This can largely be obviated by the instillation of liquid petrolatum into the nose before the introduction of the tube and the use of a lubricant with a consistency sufficient to prevent it being easily wiped off the tube by the passage through the nose. White petrolatum serves this purpose admirably. After the tube has been passed into the esophagus, if its free end or the funnel attached to it is held under water, the absence of air bubbles makes certain that the tube has not been passed into the trachea.

When dehydration is definite or extreme, or in the presence of severe or prolonged diarrhea and vomiting, recourse must be had to means other than by way of the mouth for introducing fluid into the infant. Four routes are offered: by rectum (enteroclysis), subcutaneously (hypodermoclysis), intravenously, and intraperitoneally. He has never been able to utilize the rectal route with the degree of success which is apparently obtained by others. Rectal intolerance is usually established so early that the rectal injections become not only useless but actually harmful by setting up local irritation and reflexes which further stimulate bowel evacuations.

Hypodermoclysis of normal sterile saline solution may be used in threatened dehydration or in those cases in which dehydration is only slight. Two to five-per-cent dextrose (glucose) and sodium bicarbonate solutions may be used, but as their chief value lies in the water content of these solutions they are rarely used. Donnelly prefers the saline, as it is the most easily prepared and sterilized and, unlike the sodium bicarbonate, it does not have the attendant risk of producing sloughs. Saline when sterile is safe. However, hypodermoclysis is undoubtedly a painful procedure, and the amounts which can be injected into small infants fall short of the needs of the average case of moderate or severe dehydration. Only about one hundred Cc. of saline can be administered at a time without causing discomfort to the infant. Larger amounts or multiple injections make the infant restless and irritable—the two things to be avoided in weak and dehydrated infants. In combating dehydration this method necessitates multiple punctures with their attending risk of suppuration, and therefore is not a method applicable for continuous use over seventy-two hours.

Intravenous administration of fluid has obvious advantages. He has used sterile solutions of normal saline, five-per-cent glucose, three-per-cent sodium bicarbonate, and a glucose acacia solution, made up of glucose five grammes, acacia ten grammes, and normal saline, q. s. one hundred Cc. The practical difficulties of entering the in-

fant's veins and the danger of the introduction of large amounts of fluid by the longitudinal sinus have made him reserve this method for the treament of marked dehydration cases only, where the call for replenishment of the depleted vascular system is an urgent one. When he uses this method, the hair is shaved closely off the scalp covering the anterior fontanel and for an inch beyond. The injection into the longitudinal sinus, which lies from three to five mm. beneath the scalp, is made under the strictest surgical aseptic technique. The injection is made slowly, permitting the sterile fluid to enter by gravity at the rate of three or four Cc. a minute and at a temperature of 110° F. At the first sign of discomfort or marked change in the pulse or respiratory rate the needle is withdrawn, and pressure made with sterile cotton over the puncture wound until all oozing has stopped; then it is cleansed with tincture of iodine and alcohol and a sterile cotton and collodion dressing applied. He has made numerous injections by this method and has not experienced any complications nor serious after-effects; on the contrary, many of his results have been most striking in their beneficial effects. The only contraindications to this method are the various forms of infectious dermatitis, particularly if the scalp is involved.

The use of the intraperitoneal route for the introduction of fluid is a comparatively recent therapeutic measure. In spite of the favorable reports of its use, it was not until he had satisfied himself on the cadaver that the penetration of the flaccid intestinal wall by the needle was really difficult to accomplish, were he willing to make use of this method. He has avoided the intraperitoneal injections in all cases where there was any abdominal distention, as the possibility of penetrating the intestinal wall under such circumstances cannot be denied. Donnelly carried out a series of experiments on guinea-pigs, employing various sterile solutions for intraperitoneal injections, and found them to be without any toxic or local irritant action, when employed in proper amounts and in isotonic solutions. All fluids injected into body cavities and tissues for the purpose of immediate absorption must be isotonic and made of chemically pure substances. Otherwise, in many instances, abdominal distention, local discomfort, and signs of peritoneal irritation will follow intraperitoneal injections.

Reassured that these injections were devoid of serious risk he began injections in the dehydrated infants and young children. The technique is as follows: After excluding abdominal distention and the possible presence of an overdistended bladder, the infant's arms and legs are restricted while in the recumbent position. The injection is made through the median line just below the umbilicus. The skin about this area is sterilized by the ordinary surgical method of preparation, tincture of iodine and alcohol. The skin and subcutaneous tissues are picked up between the thumb and the index-finger of the left hand. A moderately large (eighteen gauge), short beveled needle about two inches long, connected with a container by a rubber tube, is held in the right hand and inserted with a quick thrust, pointing upward and at an oblique angle, through the abdominal wall into the peritoneal cavity. The right thumb may be held on the needle about three-quarters of an inch from the point so as to prevent too deep penetration. The sterile normal saline solution is then run in slowly by gravity at a temperature of 105° to 110° F. and continued until the abdomen is slightly distended. The needle is then removed and the puncture wound covered with a sterile dressing. Usually one to two hundred Cc. may be given to young infants, larger amounts to older babies. Any evidence of shock calls for immediate withdrawal of the needle and appropriate stimulation. The fluid should not be introduced too rapidly nor in too large quantities, so as to avoid possible embarrassment to the diaphragm and heart. The whole procedure must be done under the strictest surgical aseptic technique.

During the past year he has used normal saline routinely in his intraperitoneal injections with gratifying success. A hyper-

tonic solution of glucose (ten to sixteen per cent) given intravenously after the intraperitoneal injection causes quicker absorption of the saline solution from the peritoneal cavity, and urine excretion increases earlier than otherwise. Normal saline solution is absorbed comparatively rapidly from the peritoneum. Post-mortem examinations on infants who had received intraperitoneal injections from a few hours before death to weeks previously failed to show any evidences of injury or infection of the peritoneum or abdominal viscera.

The advantages of the intraperitoneal method of administering fluid to the dehydrated infant are those which were first pointed out in this country by Blackfan and Maxcy. They are: (1) Administration of large amounts of fluid at one time. (2) The fluid is quickly absorbed. (3) The method is a simple procedure, it is practical, and permits of repeated injections at frequent intervals with minimum risk to life.

As the circulation is replenished with fluid, by whatever method, the dehydration disappears, provided the excess loss by way of the bowel has been lessened by controlling the diarrhea, the infant's general appearance becomes better, the fontanel more full, pallor disappears, there are evidences of better circulation, both general and peripheral, toxicity is lessened, the oliguria disappears, and the whole picture is that of renewed and strengthened vitality. By this means we help tide over the necessary period for readjusting the infant's feeding and gastrointestinal tract.

The Treatment of Seasonal Hay-fever.

WALKER, in the *Archives of Internal Medicine* for July, 1921, states that satisfactory preseasonal pollen treatment yields excellent results in seasonal hay-fever. By satisfactory treatment is meant five or six treatments with a 1:500 dilution of the pollen extract, or, better still, two or three treatments with a 1:100 dilution of the pollen extract.

When preseasonal pollen treatment fails, sometimes benefit results from during-the-season treatment with pollens and sometimes from during-the-season treatment with an autogenous nasal secretion vaccine. During-the-season treatment with pollens without preseasonal treatment is not very satisfactory, although such treatment for the early type of hay-fever is worth doing provided for some reason or other it is not possible to give preseasonal treatment.

Treatment that of necessity must begin late preseasonally may be continued on through the pollen season with better results than those obtained by during-the-season treatment alone, but with much less beneficial results than those obtained by beginning preseasonal treatment early enough to permit of its discontinuance before the season of pollination begins.

Although in the New England States the pollens of rose and redtop grass occasionally cause early hay-fever, treatment occasionally has to be given with these. The pollen of June grass is a more or less common cause of early hay-fever, but when the season of its pollination is very early, unless the treatment is begun very early, too little treatment can be given for it to be of benefit, and when its pollination is very late sufficient treatment with timothy pollen has been given to protect against June grass pollen exposure.

Treatment with a combination of timothy and June grass pollens was not successful in his hands because of insufficient treatment with both pollens; the addition of June grass pollen retarded the amount of treatment that otherwise would have been given with timothy alone. Another illustration of the undesirability of mixed pollen treatment is noted with those patients who have both the early and the late types of hay-fever. In these cases, during the month of May and part of June, large amounts of timothy pollen extract should be given together with small amounts of ragweed pollen extract, and the result in these cases is rather poor because there is a tendency to restrict the timothy treatment for fear of producing anaphylaxis from the combination of two pollens to which the patient is sensitive. In other words, treatment with a combination

of pollens either diminishes the amount of treatment that is required with one or all of them, or pushing the treatment with the combination leads to the danger of anaphylaxis. For either or both of these reasons he sees no benefit to be derived from mixed pollen therapy. As regards the early type of hay-fever, he considers it best to treat preseasonally with timothy or the chief causative pollen, and if necessary to treat during the season with June grass pollen.

Since intimate exposure to other pollens which may be contributing causes of hay-fever, the eating of fruits during the hay-fever season, the possibility that bacteria play a part in the cause of hay-fever, and the exposure to olfactory irritants, may all aggravate the symptoms of hay-fever, it is not remarkable that hay-fever treatment is not perfect.

Mitral Stenosis, Auricular Fibrillation, and the Action of Digitalis.

In the *British Medical Journal* of April 9, 1921, CATTLE states it has long been known that digitalis slows the heart by prolonging diastole—that is, increasing the resting period. It is the discovery of fibrillation that gives the clue to the reason why digitalis acts so remarkably in some cases, and in others appears to fail. It has a twofold action, slowing the whole heart by stimulating the vagus nerves, and, by a specific influence on the auriculoventricular bundle, blocking some of the impulses proceeding from auricles to ventricles. It is thus clear why in many cases in which the rhythm is normal and regular but little good results from digitalis, and that a great deal of the benefit derived in auricular fibrillation is due to the blocking of many of the disorderly impulses proceeding from the auricles. In this affection the heart is more susceptible to its influence, and there are times when it acts like a specific. It is more successful in rheumatic than in degenerative cases. Many cases of mitral stenosis, when the pulse is regular, do not require digitalis and are better without it. It should, however, be used whenever there is dilatation, except in acute febrile conditions. After irregularity has set in, whether in the early stages, or in the later ones characterized by edema and other signs of heart failure, the results are often brilliant.

There are many ways of giving digitalis, but for ordinary purposes the tincture is reliable. It is said to lose its potency when dispensed with water, but he has not found this to be a common occurrence. In auricular fibrillation one drachm of the tincture—that is, 10 minims every four hours, or 15 minims every six hours—should be given daily, carefully watching the effect by counting the pulse twice a day by auscultation. After four or five days the heart's rate will begin to fall; in another day or two it will be between 70 and 80, and then the drug must be left off for a few days. When the heart's beats occur in couples, as is sometimes the case, the drug should be immediately omitted for a few days. Other signs of insufficiency are severe headache, nausea, vomiting, and diarrhea. Any of these call for suspension of the drug. After a physiological reaction of this description has been obtained, an attempt should be made to find the daily quantity of digitalis which will keep the heart about the normal rate. Patients can take small tonic doses for months without bad effect if they are instructed to omit the medicine for a few days occasionally. The patient's sensations are a good guide as to whether more or less of the drug is required, and some feel best when the heart's rate is kept as low as 50.

In heart failure from purely degenerative changes, in which the pulse frequently remains quite regular, the effects of digitalis are not so good. In these conditions digitalis should be given in the same doses with the same precautions as he has already advised. Mackenzie states that he has many times attempted to reduce the increased rate of the heart when the rhythm was normal, and invariably failed. This observation certainly applies to all febrile and toxic states. Here the heart muscle is poisoned by the bacillary or other toxin,

and digitalis can have no good effect while this condition remains. It may be useful for the resulting heart weakness after elimination of the toxin. Sutherland obtained reduction of the pulse rate after the temperature had subsided in rheumatic fever. Speaking generally, more good may be anticipated when digitalis slows the heart's action; a longer period of repose is followed by a stronger beat. Cases have been reported in which good resulted although no reduction in rate was obtained.

For pulse irregularities due to premature beats, which commonly cause intermission of the pulse, digitalis should not be given. The drug itself will occasion premature beats, and would certainly aggravate the condition where the tendency already exists. It is not a safe conclusion that because a heart intermits occasionally it is necessarily a weak heart. Digitalis is often wrongly given for supposed "weak heart." Our ideas are certainly clearer than they were ten years ago as to the cases digitalis is likely to relieve and those which it is not.

Infantile Diarrhea.

LOWENBURG in the *New York Medical Journal* of August 3, 1921, advises as follows:

1. Purgative: To be employed if temperature and toxemia are pronounced. Castor oil, or calomel, if vomiting does not yield to a single lavage, to be followed by castor oil.

2. Hydrotherapy.

3. Hunger period for twenty-four to forty-eight hours. During this time give freely of saccharated tea (one grain to a quart) regardless of vomiting and continue same throughout treatment as a drink.

4. Feeding of diluted skim-milk mixture sweetened with saccharin (one grain to twenty ounces) and containing larosan with or without unsweetened cocoa. The skim milk and the larosan mixture may be replaced by Finkelstein's Eiweissmilch if this is available. Carbohydrate is gradually added, preferrably cane sugar, and strength of formula otherwise gradually increased. Larosan, cocoa and sugar gradually are reduced as mixture becomes stronger. Formula may then be boiled with arrowroot or flour ball, pancreatin and bicarbonate of soda may be added. Cereals and vegetables (comminuted) are gradually added.

5. Diarrhea mixture continued throughout treatment.

6. Potassium citrate in large dose if acidosis is marked.

7. Irrigations of one-half to one-per-cent tannic acid solution if stools contain blood.

8. Demineralization and dehydration combated by intraperitoneal injection of saline, or intravenous injection of saline, glucose, or alkaline solutions if acidosis is marked.

[We doubt the value of potassium citrate. —ED.]

Blood Transfusion via Longitudinal Sinus, with Report of Cases.

In the *Archives of Pediatrics* for April, 1921, LOWENBURG states that four persons are needed to successfully carry out transfusions by this method—two nurses and two physicians. In emergency the thing may be accomplished with less, and the idea not be abandoned because of lack of trained assistants. Team work, however, makes for success. In cases in which hurry is not necessary, the procedure should be discussed previously by those who are to take part in the work. Each is assigned his or her duty, and he or she should rehearse it well in his or her mind. Then the whole should be enacted in pantomime by all the prospective participants together until there is no hitch. The director should be the physician in charge, and all the rest must be submissive to his will and must be cautious to initiate no new maneuver, previously unknown to the rest, during the actual performance of the operation. Such an act may be fatal to a successful transfusion, though not necessarily fatal to the patient.

The infant's body is so wrapped that his limbs are immobilized much after the manner of preparation for tracheotomy. The infant lies prone upon a table of such a

height that the operator, at its head, may work at ease and comfort while sitting. His hands, when resting on the table, must be about on a level with the anterior fontanel, and under no circumstances must his position be cramped so as to cause him to point the needle from above or from below or from the side, but directly from in front of him. One nurse holds the infant's head firmly in the hollow of both her hands with fingers interlocked under its head; hence the head actually rests upon her hands and not upon the table. The palms of her hands are most advantageously placed over the infant's ears. In this position she has a certain leverage, which allows absolute control of the head, which she slightly flexes upon the chest. Her grasp must be firm and her hold steady. In one instance temporary failure resulted from the fact that the nurse, unknown to him, suffered pain from sunburned arms. She was unable to remain still and moved during the most delicate part of the operation.

The other nurse acts as general assistant at the instrument table and passes the blood-filled syringes from the assistant physician, who is stationed at the side of the donor withdrawing blood regularly in 50-Cc. Luer syringes, to the operator who injects the blood into the recipient.

Several needles, at least half a dozen of one-eighth-inch bore, are required. Each needle should contain within its bore a brass wire which must show at both ends to insure patency. A plugged needle may be discovered at the wrong moment and thus delay or spoil the entire procedure. The tip of the needle must be sharp but not too pointed, and the flange must not be too long because the sinus lies so close to the surface that the tip of the needle may be within the lumen of the sinus before the opening in the needle is covered. This may result in subdural or epidural oozing.

In addition there are needed a 10-Cc. Luer glass syringe and two or three 50-Cc. Luer glass syinges. The latter must be provided with special metal tips which will fit accurately into the needle which fits the 10-Cc. syringe. Sterile normal saline solution, sterile one-per-cent sodium citrate solution, iodine, alcohol, rubber gloves, green soap, a good razor, rubber tubing to be used as a tourniquet on the donor, a couple of hemostats to hold the latter in place, gauze and cotton, complete the list of necessities. The syringes and the needles are sterilized by boiling in weak soda solution and not by immersion in alcohol, otherwise coagulation of blood within the syringe or within the needle may ensue.

The area over the fontanel is shaved, although this is unnecessary. It is painted with iodine. The posterior angle of the anterior fontanel is accurately located by the index-finger of the left hand. The 10-Cc. Luer syringe, with the needle attached, is partly filled with sterile saline solution. The tip of the needle is plunged just beneath the surface of the skin exactly in the middle line in the posterior angle. As the tip enters the lumen of the sinus the fact is revealed by the appearance of blood within the lumen of the syringe. Meanwhile the associate physician is filling a 50-Cc. syringe (Luer) with the blood of the donor. The physician at the head of the child keeps gently pushing and pulling the plunger of his 10-Cc. syringe in and out, thus preventing blood coagulation and keeping patulous the lumen of the syringe and the needle. A nurse meanwhile sprays ether or ethyl chloride upon the barrel of the 50-Cc. syringe into which the blood of the donor is being drawn. As this syringe is filled, it is disconnected from the needle, which is allowed to remain *in situ* in the vein of the donor. The nurse passes this blood-filled syringe from the associate physician to the operator, who disconnects his 10-Cc. Luer syringe containing the saline, allowing the needle, the tip of which rests within the lumen of the sinus, to remain *in situ*. This needle is steadied with the operator's left hand. The blood-containing 50-Cc. Luer syringe is quickly connected with the needle, and the plunger is gently but firmly and continuously pushed home. Meanwhile the associate physician at the

donor's arm is filling with blood another 50-Cc. Luer syringe, previously washed out by the nurse with the sterile citrate (1-per-cent) solution. He finishes the filling of his syringe just as the last drop of blood has been delivered by the operator into the lumen of the sinus. The operator rapidly disconnects, hands the emptied syringe to the nurse as she passes him another 50-Cc. Luer syringe filled with blood given her by the associate physician. This movement between the three must be harmonious. While both physicians are now preoccupied, one at the donor's arm and the other at the infant's head, the nurse is washing out quickly but thoroughly with the citrate solution the soiled syringe just handed to her. Thus this action between the three is maintained until 150 to 250 Cc. of blood have been injected into the recipient. The amount varies according to the age and size of the infant, and the severity of the case. Needles are withdrawn from recipient and donor. Bleeding in the latter is controlled by removing the tourniquet and by elevating the arm and by applying pressure for a few minutes over the site of puncture. In the recipient, rotary pressure is applied for a short period over the fontanel at its posterior angle. A bandage is applied and the infant returned to bed or sent home.

Dried Milk Powder in Infant Feeding.

In the *Public Health Reports,* Volume 35, No. 14, April 2, 1920, PRICE states that while gain in weight alone is not sufficient evidence on which to base final conclusions, and while it may prove that excess gain over that which has been considered normal may not be desirable, his figures seem to indicate that the whole milk powder and the skimmed milk powder and unsalted butter employed in his study are useful in infant feeding, and further—and especially in the case of the whole milk powder, and in the case of babies who are undernourished and who digest natural milk badly—these remade milks may have points of distinct advantage. The figures also warrant the conclusion that reconstituted, reconstructed, and natural milks differ in their effects when fed to infants; and that reconstituted and reconstructed milks should not be substituted and sold for natural milk in a manner to deceive the purchaser.

The opinions expressed by the nurses with respect to the comparative value of reconstituted, reconstructed, and natural milk in infant feeding, and with special reference to the influence of these different milks on the babies' general development, activity, teething, and disposition, strengthen the conclusions that reconstituted and reconstructed milks, of the brand employed, are safe and useful for infant feeding, and particularly in the case of reconstituted milk, and in the case of babies who digest natural milk badly, they may have points of distinct advantage. The opinions of the nurses further strengthen the conclusion that reconstituted, reconstructed, and natural milks differ in their effects when fed to infants.

Treatment of Pruritus Ani.

In the *American Journal of Clinical Medicine* for April, 1921, PENNINGTON states that when there are few or no objective symptoms, he finds that painting the region with a 2- to 5-per cent solution of chrysarobin in traumaticin, once in three to five days, and applying the ointment given in the next paragraph, night and morning during the interim, is one of the best modes of treatment. The application sometimes gives rise to considerable pain for a few moments, especially if there are cracks and abrasions; but this soon subsides. When the surface is dry, after application, he takes a thin layer of cotton, sprinkles it with talcum or some other powder, and places it over the field to prevent staining of the underclothing.

The formula referred to just above is as follows:

> Menthol, 3 to 4 grs.;
> Phenol, 8 to 12 mins.;
> Zinc oxide ointment,
> Vaselin or tallow, ää 2 drs.
>
> M. et ft. unguentum. Sig.: Apply locally night and morning after cleansing the part with warm water and drying.

The Application of the Schick Reaction and the Immunization of Susceptibles to Diphtheria with Toxin-antitoxin.

In the *United States Naval Medical Bulletin* for April, 1921, NORWOOD states that the constitutional reaction following the injection of toxin-antitoxin was not serious in any of his 2911 subjects, though in a small number reactions similar to that following the administration of typhoid vaccine occurred. The several cases requiring bed treatment were less than 5 per cent. The total number of reactions, which includes those presenting mild symptoms such as malaise, headache, and a low temperature, but not requiring special treatment, was 8 per cent. Injection of a mixture of toxin-antitoxin in immunes generally causes a severe constitutional reaction. This occurs frequently when injections are given following a wrong interpretation of the pseudo, or false, reaction.

It is believed that a systematic application of the Schick reaction to the personnel of the navy, including all officers and men below the age of fifty, with particular attention to the recruit, and the administration of proper doses of toxin-antitoxin, would practically eliminate diphtheria from the navy.

The following conclusions and recommendations are based on the observations made on a large number of tests performed on children and adults:

(*a*) The application of the Schick reaction is simple and exceedingly practical.

(*b*) The subcutaneous or intramuscular injection of a slightly toxic mixture of toxin-antitoxin in 1-mil doses at weekly intervals until three doses are given will establish an active immunity to diphtheria in from two weeks to three months that will last from one to three years, if not permanently.

(*c*) A person presenting an immune reaction does not require prophylactic treatment if exposed to diphtheria.

(*d*) Immunes, as indicated by the reaction, who are carriers of the diphtheria bacillus do not develop the disease.

(*e*) All persons (officers and men) under fifty years of age in the naval service should be subjected to the reaction and the susceptibles immunized with toxin-antitoxin.

(*f*) The result of the test should be entered in the health record of the individual.

(*g*) Subsequent tests should be made annually on susceptibles who have been immunized, as well as natural immunes, until at least three negative tests have been recorded and the immunity proved permanent.

(*h*) Medical officers should be instructed in the technique of the test and the proper interpretation of the several reactions.

(*i*) Medical officers familiar with the work should direct special attention toward determining, if possible, the degree and the duration of the immunity conferred by toxin-antitoxin, and should make a careful report of such observations for the information of those concerned.

The Absence of Pancreatic Secretions in Sprue and the Employment of Pancreatic Extract in the Treatment of the Disease.

In the *American Journal of the Medical Sciences* for April, 1921, BROWN states that these cases are far too few in number to justify us in drawing definite general conclusions in regard to the pancreatic secretions in sprue, but we do feel that they add something to our knowledge of the secretory disturbances met with in this disease and are worth recording, both from the point of view of pathology and of treatment. The careful study of these cases leads one to certain queries anent this disease: Is sprue one or several diseases? Are the major portion of the symptoms due to the primary lesions, or are many of them much better explained on the basis of secondary starvation? Is it possible to explain the picture on the assumption that it represents an infection due to a monilium, and, if so, is one or several species involved? Or may various organisms or groups of organisms having the

common quality of producing marked acid fermentative changes in the chyme bring about these symptoms? What rôle does diet play? May this possibly be a new member of the ever-increasing group of deficiency diseases? Is sprue very much more widely disseminated in temperate climates than has hitherto been supposed, and may it play some rôle in certain of the vague chronic digestive disturbances so frequently met with in countries which lie in the southern portions of our temperate zones—for example, our Southern States?

Whatever our answer be to these queries, Brown feels that the study of his cases shows that in certain at least of the chronic cases of the disease (1) there is a practically complete absence of the pancreatic ferments, and (2) that while, obviously, all the well-recognized forms of treatment—dietetic, hygienic, etc.—should be rigorously carried out, nevertheless very great improvement and, in some cases, apparently clinical cure can be brought about by regular and constant administration of pancreatin.

Vaccine Therapy the Most Rational and Effective Method of Preventing Whooping-cough in Public Institutions.

In the *New Orleans Medical and Surgical Journal* for April, 1921, BLOOM and DE REYNA state that during the month of April, 1919, five cases of whooping-cough were noted in the St. Vincent's Foundling Orphan Asylum. The cases in question were discovered in different wards, in the second stage of the disease. Practically all of the children had been subjected to infection. Promptly these children were isolated and an attempt was made to limit the further spread of this serious malady.

Appreciating the prophylactic virtue of the pertussis vaccine, they decided to use this method, in the hope of eradicating this disease. In order to state the value of the results obtained, it might not be amiss to give the readers a brief mention relative to this institution. This asylum cares in the main part for the greater number of illegitimate children born in this institution, city, and in neighboring parishes. A large per cent of those admitted are marasmic; others show different manifestations of malnutrition; and many give signs of congenital lues. The resident population is constantly changing, inasmuch as many of the children are adopted, and the older ones are sent to different institutions for further care and permanent abode. The dietetic consideration is seriously wanting, and even though some children have remained in this institution for a period of three or four years they are more or less under par.

The institution is overcrowded and the buildings are old and antiquated. These facts are given not in the way of disparagement, but simply to demonstrate forcibly that even with serious handicaps in the way of birth and environmental factors the protected children did not contract whooping-cough although they were intimately exposed to this disease.

The Cases.

Under 1 mo. (youngest case 10 days)	13 cases
1 mo. to 6 mos.	50 "
6 mos. to 1 yr.	34 "
1 yr. to 6 yrs.	107 "
Total	204 "

The vaccine employed in this institution was a mixed stock vaccine (recently prepared within one month). No preservative was used in its manufacture. Each Cc. of this vaccine contained 5,000,000,000 Bordet-Gengou bacilli and 3,500,000,000 influenzæ bacilli.

The Method.—Infants under 6 months, ¼ Cc., 3 doses, on alternate days. Infants from 6 months to 1 year, ½ Cc., 3 doses, on alternate days. Children from 2 to 6 years, 1¼ Cc., 3 doses, on alternate days.

The Results.—In previous years not less than fifty per cent of the entire number of children living in the institution contracted whooping-cough. From the first week in May, 1919, to the first of January, 1920, there was not a new case of whooping-cough noted in the institution. Bloom and De Reyna believe it is evident that the prophylactic use of this vaccine has untold possibilities in the prevention of whooping-

cough in asylums, schools, and public institutions, and in the limiting of disastrous epidemics.

Induced Pneumothorax in the Treatment of Pulmonary Tuberculosis.

In the *New York Medical Journal* of April 6, 1921, STIVELMAN states that the percentage of cases suitable for pneumothorax had been variously estimated from five to twenty per cent. This extreme variation is due to the fact that the studies were not made from comparable material. Those who treat the very early tuberculous report a greater percentage of suitable cases. On the other hand, those who are in charge of hospitals for the far-advanced tuberculous see but few suitable cases. For a similar reason, reliable statistics on the results of this therapy are not available. Those who treat incipient and strictly unilateral cases are able to show a larger percentage of excellent results than those who apply this treatment in the advanced and hopeless cases.

At a sanatorium with which he is connected an excellent opportunity presented itself to study the value of pneumothorax in all forms and stages of phthisis in which it is indicated. More than half of his cases were observed for a long period of time and were hopelessly progressive. Others were suffering from uncontrollable hemoptysis. In these two groups pneumothorax was induced as a last resort. On the other hand, many of his cases were moderately advanced, and although the better lung was not much involved they ran an active and progressive course, and pneumothorax was induced as a matter of choice.

Of the last sixty-five cases so treated, thirty-eight suffered from far-advanced bilateral lesions, ran an active, progressive course, and their chances for recovery under the ordinary sanatorium care were very poor. Of these, four, or 10.4 per cent, were discharged with disease in arrested condition. Eighteen, or 47 per cent, made remarkable improvement, their constitutional symptoms abated, cough and expectoration markedly decreased, and many were able to go home and resume their duties as bread-winners. Three of these cases received pneumothorax on account of uncontrollable, severe, recurrent hemoptysis. The remaining sixteen, or 2.6 per cent, did not profit by this treatment. In eight of these the lesion in the other side was activated, three developed pyopneumothorax, in four the preëxisting tuberculous laryngitis assumed dangerous proportions, and one died of meningitis.

In this group there were also three cases in which the induction of pneumothorax could not be effected on account of obliteration of the pleura. Two of these have since died and one is progressive.

Pneumothorax was also induced in twenty-seven moderately advanced cases which ran an active and progressive course, and although in these the better lung was only slightly involved, their prognosis was not at all favorable. Fourteen, or 52 per cent, of these were discharged with disease arrested; the condition of nine, or 33 per cent, improved so markedly that they were able to leave the institution and do at least part of the work they had done before their illness. In four cases, or 15 per cent, the pneumothorax was of no benefit because of the progress of the disease on the untreated side. In this group there were three cases in which pneumothorax was induced on account of severe, uncontrollable hemoptysis.

In this group there were also four cases in which inflation of the pleura was technically impossible. Three of these are progressive and one is holding his own.

Analysis of these figures shows that 28 per cent of all hopeless cases were discharged with disease arrested, 42 per cent with condition markedly improved, and 30 per cent did not profit by this treatment; while in a similar group of patients in whom pneumothorax could not be induced on account of technical difficulties, 85 per cent have either died or are progressing rapidly to a fatal termination.

In view of the results obtainable with artificial pneumothorax in a class of patients

whose prognosis is hopeless otherwise, it is obvious that this method of treatment represents the most remarkable advance in the treatment of tuberculosis in modern times. No excuses are to be offered for its induction in suitable cases. On the contrary, many should be asked to explain why they do not resort to this treatment when all other measures fail. There are many who attempt to discredit this method of treatment, although they have had absolutely no experience with it. Others presumably on account of their inability to choose the proper case and to judiciously maintain a satisfactory pneumothorax openly oppose it.

The Problem of Gastroptosis.

In the *Ohio State Medical Journal* for April, 1921, the editor makes the following note in reference to an article on this subject by Dr. Willard C. Stoner:

It is difficult if not impossible to really determine in what measure faulty anatomy, posture, and inherited nervous weakness contribute to the incidence of gastroptosis. Clinical observation, however, proves that loss in weight, impaired muscle tone, whether from disease or poor nutrition, heavy lifting, overwork, improper dress, changes in the female pelvis incident to puberty and repeated pregnancies are definite factors in establishing the condition. It is interesting to note that gastroptosis may exist without symptoms and without any change in the secretory or motor function of the stomach; that the symptoms do not necessarily conform to the degree of ptosis. We have no means of knowing, as yet, the sequence in these cases; whether ptosis produces symptoms or whether the condition incident to the symptoms results in ptosis. The important factor in the vicious circle of this condition is an inherent unstable nervous state. Absolute rest with forced feeding to promote nervous stability and increase weight, and massage to enhance muscle tone, are important simple phases in the successful management of gastroptosis.

Treatment of Vomiting in Pregnancy by Adrenalin.

The Practitioner for April, 1921, in its columns on "Practical Notes" states that Ruthery and Bordet report excellent results obtained in the treatment by adrenalin of persistent vomiting in pregnancy. They give the drug by hypodermic injection, 1 mg. of adrenalin hydrochloride in 250 Cc. of normal saline, by ingestion of 1 mg., or by enema containing 1 mg. The daily amount given does not exceed 2 mg., and the total amount given has been from 4 to 8 mg. in the course of from four to seven days.

The vomiting ceases almost immediately, the general condition improves quickly, diuresis increases by degrees, and the arterial tension is in no way altered.

A Protest Against Radicalism in Surgery of the Nose, Throat and Mouth.

In the *Journal of the Medical Society of New Jersey* for April, 1921, KNOX states that it seems to be difficult or impossible for us in the first flush of surgical achievement to keep within the bounds of healthy conservatism. First one type of surgery and then another has suffered because of the grandiose self-assurance of enthusiasts.

When he began the study of medicine eighteen years ago surgery of the lower abdomen and pelvis was the *pièce de résistance;* every ileocecal colic called for an appendectomy, and every retroverted uterus required fixation. We have now a long line of postoperative neurasthenics that had better have been left alone.

This misguided effort has now subsided to some degree, and the nasopharynx and mouth have become the channels through which the modern young man finds sublimation and outlet for his *libido.*

He is utterly opposed to the indiscriminate removal of teeth, tonsils, and nasal bones. The last word has not been said in the case of focal infections; far from it. He believes that in the expectancy of certain cardiac, articular and choreiform

conditions ectomy of tonsils and adenoids should be considered, and he also believes that in practically every other condition the organisms causing the symptoms should be identified and found to be the same as those infecting the focus which it has been proposed to remove; especially should this be done when the focus is accessible. He knows from a considerable experience that the effect of tooth extraction in the neuroses has been much overrated, and the results on general health of the use of artificial teeth are in many cases worse than the pus could ever have been.

Adrenalin Hypersensitiveness and its Relation to Hyperthyroidism.

In the *American Journal of the Medical Sciences* for April, 1921, PEABODY, STURGIS, TOMPKINS and WEARN state that the general conclusions which it seems justifiable to draw from their observations are as follows:

1. Different individuals, both sick and well, react with different degrees of intensity to the injection of adrenalin. By means of selected dosage of the drug and carefully chosen criteria for the response, one can differentiate, somewhat artificially, between the slight reactions which are called "negative" and the more violent reactions which are called "positive." In certain instances "doubtful" or "questionable" reactions are obtained.

2. The fundamental nature of the reaction is unknown. It is associated with a rise in heat production which runs more or less parallel to the intensity of the reaction. On the basis of what is definitely understood with regard to the physiologic action of adrenalin it seems probable that the phenomenon is due to a stimulation of the sympathetic nervous system. Theoretically a "positive" reaction might indicate hyperactivity of the thyroid gland, of the adrenal glands, or of the sympathetic nervous system. It might, on the other hand, depend on a lowered threshold of response of the sympathetic nervous system. With the exception of hyperthyroidism little is known about these conditions in man, but they probably occur, and there would seem to be no reason for assuming that a "positive" adrenalin reaction is constantly associated with hyperthyroidism. It is much more likely that different causes account for the reaction in different types of clinical cases.

3. Hypersensitiveness to adrenalin is found in many patients with the clinical picture of hyperthyroidism and with an increased basal metabolism, but it is not constant under these conditions.

4. Hypersensitiveness to adrenalin is also found in persons who have no indications of hyperthyroidism. Thus it was present in many psychoneurotics, in about 50 per cent of patients convalescent from acute infections, in nearly the same proportion of soldiers with "effort syndrome," in 14 per cent of apparently normal young men, and in patients with various unrelated diseases.

5. The "positive" reaction to adrenalin appears to occur most often in highly nervous individuals, but it is not constant in such persons. The clinical significance of the reaction is not clear, but at present it should certainly not be regarded as having any specific significance in the diagnosis of hyperthyroidism.

Influenza.

In the *American Journal of the Medical Sciences* for April, 1921, FROTHINGHAM states that considerable interest has been aroused in regard to the possibility of vaccination as a prophylactic measure against this pandemic disease, and as a prophylactic measure against the development of pneumonia as a complication of the disease. On the assumption that the disease was caused by the influenza bacillus, and as the pneumococcus and streptococcus were frequent secondary invading organisms in the lungs, vaccines were prepared by combining cultures of influenza bacillus with the various types of pneumococci and streptococci. Individual reports have been made by Rosenow and Sturdivant and others

favorable to the use of these vaccines, not only in preventing the disease but also in diminishing the amount of pneumonia and the fatalities from it. Most of the work with vaccines has been carried out in regions in which the disease was already present, and therefore it was impossible to carefully control the experiments.

McCoy and his coworkers succeeded in studying the value of a protective vaccine under careful control, and found that not only it did not prevent the disease but also it did not influence the incidence of pneumonia or the mortality from it. McCoy perhaps sums up the situation most clearly in his statement that figures from uncontrolled experiments seem to suggest that the vaccine is of value, but carefully controlled experiments show that it is of no use. On the assumption that this disease was spread by the dissemination of the virus by means of droplets from the respiratory tract, elaborate measures to prevent the spread of the virus by the wearing of masks, etc., have been suggested and tried out not only among the ill and their attendants, but among the entire population of a community. The value of such procedure in the absence of carefully controlled experiments is quite uncertain, and the sense of protection given to the public, if erroneous, may be harmful. Some doubt exists as to the value of such procedures with our present knowledge.

Complications of the Arsphenamine Treatment of Syphilis.

The *Journal of Laboratory and Clinical Medicine* for March, 1921, in an editorial on this subject, states that the matter of toxic reactions that appear during or after treatment—especially the intravenous—with arsenic preparations is discussed by Parnell and Fildes upon the basis of their experience with the intensive treatment with neosalvarsan (neokharsivan and novarsenobillon). Most of the cases were suffering from early syphilis, and all were, except for their infections, healthy. There were 1250 patients treated, and each received a course of six doses of 0.45 grm. given intravenously at two-day intervals. Parnell and Fildes separate the toxic reactions which they believe are due to the drug itself from the so-called endotoxic reactions, which they say are invariable to a greater or less extent after the first and occasionally after the second injection in cases of early untreated syphilis. These reactions consist of pyrexia, which usually starts six hours after the injection, and may be accompanied by a chill or headache and nausea. The cause of this is, they say, to be found in the "syphilis toxin" which is suddenly liberated from the treponemas by the destructive action of the drug. They also exclude what they call "water fever," which is due to impure water, and which consists in a fever starting very shortly after the injection.

The symptoms upon which the authors place emphasis are pyrexia, skin lesions, headache, suffusion of the eyes, vomiting, edema, pain, herpes, rigors, delirium, coryza, nausea, jaundice, albuminuria, dryness of throat, air hunger, salivation, cyanosis, biliuria, and a number of other minor ailments. Pyrexia, skin lesions, headache and suffused eyes vary in incidence. The skin lesions were mostly erythematous or macular in type. Symptoms of any type occurred in but 55 of the series of cases, and for the most part they were exceedingly mild. Considering the potency of the drug and the number of patients in whom it was used, the number of complications is almost negligible.

In connection with this matter of ill effects of salvarsan it is of interest that in the Report of the Medical Research Committee the causes are assigned to (1) toxicity of the drug; (2) errors in technique; (3) susceptibility of the patient; (4) causes unknown. Given a standard preparation of the drug, and a good technique, including testing of the ampoules by immersion in alcohol before using them, the main cause is a personal susceptibility of the patient. If the drug is administered by the gravity method, then an essential part of the technique includes careful preparation of the rubber tubing.

The committee gives hemophilia, Graves's disease, Addison's disease, lymphatism, syphilis of the central nervous system, cardiac disease (especially myocardial), aneurism and arteriosclerosis, severe pulmonary disease, hepatic disease, gastric and intestinal catarrh, renal disease, alcoholism, acute septic conditions and constitutional tendency to skin diseases, as calling for caution in the use of arsphenamine. As danger-signals during treatment they give loss of weight, headache, insomnia, loss of appetite, appearance of renal symptoms, stomatitis, diarrhea, jaundice, and erythema. Still more information, statistically speaking, is obtained from the committee of German physicians, whose report is reviewed by Meirowsky. This report deals with 13,000 injections with old salvarsan, 40,954 of sodium salvarsan, 171,826 of neosalvarsan, and 64,500 of silver salvarsan. Out of the total injections of old sodium and neosalvarsan there were 12 deaths attributed to the drug (1 in 18,815); but as some of the fatalities might have been avoided by more careful precautions the chance of death is put at 1 in 56,445 (1 in 13,000 with old salvarsan, 1 in 20,000 with sodium salvarsan, and 1 in 162,800 with neosalvarsan). When the dose of neosalvarsan exceeded 0.6 the deaths rose to 1 in 3000, hence the committee recommend that 0.6 be the maximum dose. Encephalitis and dermatitis are more liable to occur after an overdose.

The Intravenous Use of Corpus Luteum Extract in Nausea of Pregnancy.

Hirst in the *Journal of the American Medical Association* of March 19, 1921, states that preparations of corpus luteum available are: (1) a compressed tablet, containing about 5 grains of the dried substance; (2) powdered extract; and (3) ampoules for hypodermic administration, containing 0.2 gm. of the dried substance in solution in 1 Cc. of physiologic sodium chloride solution.

Corpus luteum may be administered (1) by the mouth; (2) by subcutaneous injection; (3) by deep intramuscular injection; or (4) by intravenous injection.

Administration by mouth, using either the tablets or the powder, leaves much to be desired. The substance is affected by oxidation on exposure to the air; it is radically changed by the process of digestion, and often causes considerable nausea and other gastric disturbance. The good results obtained are far less striking than by hypodermic injection.

Subcutaneous injection is mentioned only to be condemned. Any animal extract given superficially under the skin causes considerable pain, local reaction, and often local suppuration.

Deep intramuscular injection is much more desirable. The choice of location is the deltoid muscle, and the injection is given deeply into the muscle. The needle should be perpendicular to the skin surface, and not inclined at an angle, as is usual in ordinary injections. Whatever site is chosen, the needle must be long enough to penetrate through the superficial fat, into the muscle. This method has given about 80 per cent of successful results, but has the slight objection that there is often some muscular stiffness and slight local reaction, but nothing of any moment. In several thousand injections he has not yet seen a case of suppuration.

Intravenous injection should be and he believes is the ideal method of administration. At first there was some doubt as to the sterility of the solution in ampoules, but very extensive experience with the intramuscular injection, without a single case of suppuration, finally gave him confidence enough to warrant the trial of intravenous injection. For the last two years his assistants and he have used no other method. Their experience includes ambulatory dispensary and office patients, and bedridden patients in the hospital and in private homes.

Reasons for intravenous injections are as follows: The material used is carried directly into the circulation, giving the most

rapid absorption possible. It is possible and advisable to use a considerably larger dose (two or three ampoules) than is possible with the intramuscular injection, in which more than 1 Cc. causes considerable local reaction. Each ampoule contains only 0.2 gm. of the extract, and in this way the necessary total quantity can be introduced more easily and quickly. There is no local reaction or discomfort of any kind after the injection. Intravenous administration often controls the vomiting promptly, in cases in which intramuscular use has failed.

The method of administration does not differ materially from the ordinary intravenous injection:

A glass hypodermic syringe of 3 Cc. capacity is prepared by boiling, and cooled. Alcohol is not desirable as an antiseptic for the syringe or needle.

The ampoules to be used are washed and rubbed thoroughly with an alcohol pad.

The ampoules are filed at the neck and broken in sterile gauze, and the contents drawn into the syringe.

A tourniquet is placed on the patient's arm, above the elbow.

When the veins become prominent, at the bend of the elbow, a suitable one is chosen and the skin over it is painted with 7-percent tincture of iodine.

The needle, attached to the filled syringe, is passed through the skin into the vein.

As a test, the plunger of the syringe is pulled slightly back, and if the needle is in the vein, blood will appear in the syringe.

The tourniquet is loosened, and the contents of the syringe slowly injected, taking about fifteen seconds to each cubic centimeter.

When the syringe is empty, the needle is withdrawn. The small puncture requires no dressing.

The same vein can be used repeatedly.

In stout women it is often difficult to locate any vein at the elbow. In such cases the veins in the back of the hand are usually the most accessible.

The dosage varies, depending on the type of case under treatment. Ambulatory patients who can come to the office or dispensary usually receive 2 Cc. every other day. In more severe cases, when office visits would be a hardship, the patients receive 2 Cc. daily, given at home. In pernicious cases 2 Cc. is given twice daily, and the patients are of course confined to bed. Experience has shown that patients should receive at least 12 Cc. entirely irrespective of the fact that they respond quickly and favorably to a smaller number. If fewer are used relapses are common, and are more difficult of control than the original attack.

Anaphylactic reactions need not be feared. In many hundred injections, all intravenous, in the hands of his assistants and himself, there was one single case in which a reaction occurred, and that case was somewhat questionable.

The patient was a very neurotic dispensary patient. Shortly after the injection she began to vomit excessively; a similar attack, however, had occurred also before any injection had been given. As a precautionary measure she was kept in the hospital over night, but no further untoward symptoms were observed. It is, of course, possible that an occasional protein-sensitive individual might show a measure of reaction after injections; but this would occur with any serum, and the possibility is negligible.

One word of caution is needed. The presence of a goitre in early pregnancy absolutely contraindicates the administration of corpus luteum extract, either intravenously or intramuscularly, for the control of nausea. In their experience every such patient has been made much worse by this treatment.

In not a single case has there been any rise of temperature or any evidence of infection following the intravenous use of the extract. They have learned to have confidence in its sterility and now employ it in no other way. The results are more gratifying, more prompt and more lasting than by any other method, and he is confident that the extended experience of the profession will bear out these statements.

Since this article was written there has

been one other case of moderate reaction, evidencing slight shock and vaginal bleeding. This patient aborted within twenty-four hours, and is the only one in the records in whom abortion seemed to have resulted from the injection.

Recognizing and Treating Neurosyphilis in the Early Period of the Infection.

In the *American Journal of the Medical Sciences* for March, 1921, FORDYCE states that a definite and constructive plan for the prophylaxis of the degenerative stage of syphilis of the central nervous system and its treatment in the initial stages can only be devised by a study of the infection in its inception. His clinical and serological work during the past ten years has enabled him to formulate the following propositions:

1. Syphilis of the nervous system probably begins in the first year of the infection. The number of cases corresponds roughly with the total number of cases of so-called late neurosyphilis. The foregoing statements are based on the following observations and established facts: (*a*) The number of early cases showing positive findings in the spinal fluid; (*b*) familial types of neurosyphilis; (*c*) biologic evidence of a neurotrophic strain of the treponema; (*d*) persistence of the infection *in loco*, as in aortitis, interstitial keratitis, etc.; (*e*) observation of patients who developed signs of early syphilis of the nervous system and who after many years died of paresis or other late degenerations; (*f*) no serologic evidence as yet exists showing normal spinal fluid in the early stage and its infection at a later period.

2. Early neurosyphilis may manifest itself by obtrusive symptoms, by slight objective signs, or be asymptomatic. Treatment by the usual channels may control the obtrusive symptoms. It seldom cures the underlying infection. Symptoms at times develop during or shortly after intensive courses of arsphenamine and mercury. If not cured these early infections may persist and cause late neurosyphilis.

3. Acceptance of the foregoing propositions leads to the logical deduction that no case of syphilis should be discharged without the knowledge gained by examination of the spinal fluid. In case no evidence of infection is found a prognosis of probable future immunity may be made. If infection exists it should be treated by methods shown by experience to be effective.

4. Fordyce is convinced by an experience of seven years in the use of intraspinal therapy that practically all cases of early neurosyphilis can be cured more rapidly, and in the majority of cases only cured, by the combined intravenous and intraspinal method.

Cataclysmal Hemorrhage After Tonsillectomy.

The *British Medical Journal* of March 12, 1921, in an editorial on this subject, states that bleeding of great severity is fortunately rare after tonsillectomy, and overwhelming hemorrhage leading to the almost instant death of the patient is amongst the rarities of medicine. A brisk arterial spurting from the tonsil-bed is not very uncommon, particularly in those adults who have a sclerotic, buried tonsil. In such cases the vessel involved is commonly belived to be the ascending pharyngeal, or more rarely one of the other arteries which supply the tonsil, but abnormally placed or abnormally large.

There are, however, in the archives of medicine records of cases in which the hemorrhage was so appalling that one or other of the carotid vessels was believed to have been injured, no other regional vessel being thought capable of such violent bleeding. Fear of a disaster of this nature was well known to our fathers, and forms the background to a story told of Nélaton. A friend met Nélaton at some distance from Paris, and asked him what brought him thither. "I have just done the operation," he replied, "which takes most of me. I have removed two tonsils." With this anecdote M. Sebileau closes an exceedingly interesting description of an overwhelming

and immediately fatal hemorrhage following tonsillectomy. M. Sebileau was not himself the operator. It was his duty to perform a necropsy on the child in question with a view to the absolution or arraigning of the surgeon. All who prize good writing, and particularly dramatic writing, may be recommended to read M. Sebileau's account of the operation and its sequels.

The possibility of wounding either of the carotids has been doubted by many, and M. Sebileau went to considerable pains to establish beyond doubt the source of the hemorrhage in this case. He injected the two carotids and the internal jugular severally with three different colored media, and was able to show beyond all question that a piece had been cut out of the wall of the internal carotid artery. Precisely how this happened, how the surgeon went blindly after the upper pole of the tonsil which had escaped removal, and how, hampered by the child's struggles, he cut away the posterior faucial pillar instead, is vividly described. The paper is well documented and contains a useful description of the relationships of the various vessels to the tonsillar fossa. M. Sebileau searched the literature of the subject and has found some eight or more recorded examples. It is not certain that in all of these the carotid was the vessel injured, but the violence of the hemorrhage makes this probable. M. Sebileau has collected also six cases of injury to the carotid inflicted whilst incising a tonsillar abscess. These accidents, when they do occur, are amongst the most painful disasters that can befall a surgeon.

Pneumonia Following Influenza in the Camps in the United States.

In *The Military Surgeon* for March, 1921, IRONS states that in the endeavor to do all possible to save lives many methods of treatment were tried both for prophylaxis and the cure of pneumonia. In general it seems evident that there has been no distinct advance in special methods of therapy, and that so far the most effective treatment is that afforded by rest in bed, good nursing care, a light, easily digested diet, careful observations to detect complications, the treatment of special symptoms such as cardiac weakness by digitalis, as they arise, the avoidance of unnecessary moving of the patient, and continued care with daily watchful supervision and graduated exercise during convalescence.

There seems to have been no value in prophylactic injections of vaccines in the prevention of influenza, nor should we expect there to be, in view of the fact that we do not know the causal organism. Assuming that prophylactic injections of pneumococcus vaccine are effectual in preventing pneumococcus lobar pneumonia, no specific effect from a vaccine could be anticipated, in preventing pneumonia following influenza due to the streptococcus or staphylococcus.

The most important single factor in preventing pneumonia following influenza was early hospitalization, with rest in bed in warm, well ventilated wards, and with precautions to prevent infection of one patient with organisms from other patients who might harbor more virulent strains. The value of immediate rest in bed at the onset of influenza was shown in a multitude of instances. Of two large groups of nurses, one group of whom tried to remain on duty while suffering from influenza, while the other group went to bed at the first symptoms of illness, the incidence of pneumonia was almost twice as great in the first as in the second. Many of the severe pneumonias admitted to the wards from line organizations were in soldiers who had sat around in quarters during their first attacks of influenza and came to the hospital only on the appearance of the more severe illness.

Care of the bowels providing for daily evacuation was important. The establishment of any routine treatment to be given all pneumonias seemed to be productive of as much harm as good. Under such a rule, whether digitalis, salicylates, opiates, atropine, or other drug is so ordered, a number of patients will receive an excess and suffer the consequences of overdrugging. Individualization and common sense were never

at a greater premium than in the army camps during the epidemic.

Various forms of intravenous therapy by injecting proteins, vaccines, peptone solutions, solutions of liquor formaldehydi and of glucose were employed, but a review of reports of results obtained does not convince one of their efficacy. It may be noted that their use is not free from danger.

Convalescent serum was used to some extent, with results believed to be favorable by some of those using it. Most of the reports however lack adequate controls, or when controls are given it is not clear that controls and treated cases were distributed equally in the same period of the epidemic.

The Internal Secretion of Sandstroem's Glands, Parathyroid Hypofunction, and Eclampsia.

In the *American Journal of Physiology* for March, 1921, in the Proceedings of the American Physiological Society, MASSAGLIA states that dogs and cats operated upon for removal of two or three parathyroids, if they live in normal conditions, have no nervous symptoms. This special state is called "latent parathyroid insufficiency." When there is in the circulation an increase of the toxic substances which the parathyroids neutralize, the single parathyroid, or the two parathyroids which remain, become unable completely to perform their function, and we have an autointoxication ending in tetanic symptoms. Therefore with an increase of determined poisons in animals in a state of latent parathyroid insufficiency, a resulting tetany will show that kind of poisons are neutralized by the parathyroids. The waste products were increased in the circulation by means of: (*a*) pregnancy; (*b*) an impairment of the function of the kidneys by means of progressive stenosis of the ureters and of the renal veins; (*c*) a derangement of the liver caused by a progressive stenosis of the ductus choledochus or of the portal vein, or (*d*) from phosphorus poisoning; (*e*) muscular fatigue induced by forcing dogs to run for a long time in a treadmill; (*f*) lead poisoning.

The study brought out the following facts: (1) The parathyroids neutralize the poisons from pregnancy, from muscular fatigue, and from the intestine; they do not neutralize phosphorus or lead poisoning. (2) Parathyroid hypofunction—especially in pregnancy—produces an autointoxication which injures the kidneys and the liver. However, neither a renal nor a hepatic hypofunction will directly produce a parathyroid hypofunction. (3) Parathyroid hypofunction in pregnancy produces a tetanic syndrome exactly similar to eclampsia; therefore parathyroid hypofunction can be one of the causes of eclampsia. This does not preclude the possibility of other etiological factors. This conception is supported not only by experiment, but also by the findings in several autopsies on eclamptic women which showed a lack of the normal number of Sandstroem's glands or severe lesions in the parathyroids.

In eclampsia caused by parathyroid hypofunction, prompt treatment with parathyroidin gives good results.

The Simple Detection and Qualitative Tests for Morphia, Its Compounds, and Derivatives.

In the *China Medical Journal* for March, 1921, READ states that he has analyzed many samples submitted for examination during the last twelve years, and circumstance has forced the development of simple methods. The following procedure should be of service to many, whose work is limited to the use of simple hospital drugs:

Take the powder or the pulverized material and add several times its volume of dilute sulphuric acid. Let stand over night, then filter. Add one volume of hot chloroform, and after the cloroform enough strong ammonia to make the solution alkaline; test with litmus paper. Mix, and after allowing the chloroform to separate, remove it with a pipette or by any other suitable means. Allow the chloroform to evaporate to dryness in an evaporating dish

or a watch-glass, and test the residue with a drop or two of Kobert's solution—*i.e.*, strong sulphuric acid containing about five per cent of formalin, made by mixing two or three drops of formalin with three or four mils of strong sulphuric acid. An extract from an opium or morphia preparation will always give a vivid purple-violet color. Another spot on the dish may be tested with strong nitric acid, which gives with morphia an orange color quickly fading to yellow.

If the sample tested be a white powder or of very small bulk, the above tests with formalin-sulphuric acid and nitric acid may be made directly—*i.e.*, without mixing with acid and subsequently extracting chloroform and ammonia. A few grains of powder under the microscope surround themselves with purplish-red or violet zones when treated with formalin-sulphuric acid.

From time to time one sees the problem of the detection of opium or morphia approached from various angles, such as the toxicological detection of morphine in the various body organs. Practically all of these tests are included in a general statement of the reaction of morphia with various test solutions and reagents. The other compounds of morphia very occasionally met with, such as heroin (diacetyl morphine), peronin (benzyl morphine), dionin (monoethyl morphine hydrochloride), etc., respond to a number of these tests as indicated. These are given here for use of the more expert worker, in the order found to be most useful:

1. Kobert's test, as mentioned above. Dionin, heroin, codeine and most morphia compounds give a similar reaction.

2. Morphine gives with strong nitric acid an orange color, changing to yellow. Codeine and heroin give only a light yellow color.

3. Morphine, or its compounds, is precipitated by all the usual alkaloidal reagents, *e.g.*, picric acid, potassiomercuric iodide, iodopotassium iodide, etc.

4. Morphine gives a blue color to a paste of ammonium molybdate in strong sulphuric acid. Sensitive to one hundredth of a milligramme. Titanic acid and tungstates give similar reactions.

5. Morphine and its salts give a blue color with ferric chloride solution, which is assisted by the presence of acetic acid. Heroin, codeine, and dionin give this reaction after heating with sulphuric acid.

6. A trace of morphine added to 5 mils of very dilute potassium ferri-cyanide to which has been added a trace of ferric chloride produces a deep blue color. Peronin, codeine, and dionin do not give this color. Heroin gives this reaction after heating with sulphuric acid.

7. Morphine liberates iodine from iodic acid, giving a blue with starch paste. Peronin, heroin, codeine, and dionin fail to liberate iodine.

9. Lloyd's test. A mixture of morphine and hydrastin mixed with a few drops of sulphuric acid develops after about five minutes a blue-violet color. This is specific.

10. A five-per-cent solution of sodium phosphomolybdate produces with morphine solutions a yellow precipitate soluble in ammonia.

Explosion of Ether Vapor During Laryngoscopy.

McCardie in the *British Medical Journal* of April 9, 1921, cites the case of a man of fifty-six who was given open ether to induce anesthesia for laryngoscopy and removal of a piece of the vocal cord. For some minutes before the laryngoscope was introduced ether with oxygen was given through a nasal catheter in addition to ether from the mask. The mouth being opened, ether and oxygen still passing in through the nose, an associate began to introduce Hill's electric laryngoscope. It had not entered more than an inch when there occurred two or three loud reports like small pistol shots, and flames issued from the patient's mouth. These were five or six inches high, and like those seen if a bottle of ether were set on fire. The nasal tube was at once pulled out and the flames quickly died. Anesthesia was continued with chloroform and oxygen without trouble. There was no obvious burning—merely reddening of the

mouth and pharynx—and the patient recovered normally and had no after-cough.

At the time of the explosion the room (temperature 65° F.) was lit by two ½-watt bulbs and one Osram bulb under a shade 2½ feet away almost directly over the patient's head. The bulb of the laryngoscope light did not fuse, and the light appeared in order and there was no evidence of short-circuiting.

Commenting on this case, McCardie said that no heat could be felt by the hand when the light was first switched on. The warm room, warm mouth, warm electric light, warm ether and oxygen, would all help toward the explosion. Ether vapor would take fire at a considerable distance from the source of heat. Squibb had seen ether take fire at a measured distance of 15 feet between the source of escaping vapor and the source of fire. Considering the absolute coincidence of the explosion with the introduction of the lamp, the cause must be found in the electric bulb of the laryngoscope. McCardie related the only other recorded case of ignition of ether vapor in the presence of a closed electric light, and other observers brought forward instances of ether vapor ignition under various circumstances.

Adrenalin in Resuscitation.

The *British Medical Journal* of April 9, 1921, in its "Correspondence" columns publishes the following letter on this topic from Marjoribanks of Aden:

The valuable letter of Lockhart-Mummery in the *Journal* on January 15 may appeal to more of us than he seems to think.

Surely he makes too much of his dilution of adrenalin to 1 in 50,000 before administration. Experimental physiologists have long recognized with regard to intravenous administration that dilution of drugs with the blood can be secured to any extent by slowness of injection. That Lockhart-Mummery found by his observations that 1 in 50,000 was the optimum dilution of adrenalin means no more than that it was the optimum at the rate at which he injected; no two operators would inject at the same rate and so secure the same dilution in the general circulation, however constant the contents of their syringes were.

The "person skilled in the use of adrenalin transfusion," the necessity for whose presence Lockhart-Mummery considers such a grave limitation of the scope of the procedure he advocates, need be no other than any one of us who is accustomed to using a 10- or 20-Cc. syringe for intravenous medication.

It is this recognition that the blood is the best diluent that has changed the intravenous administration of quinine—for example, from being a procedure for those "skilled in transfusion" to being a matter of an intravenous injection easily within the competence of any tropical practitioner. Provided he takes the precaution of adding 5 minims of liquor adrenalin to his solution, and of injecting slowly, he can avoid the one danger of intravenous injection of quinine—that of a drop in the blood-pressure. The tetanus spore, the bogey of the intramuscular method, he may leave to be dealt with by the leucocytes; and his patients never remind him of his intravenous injections of quinine as they did of his intramuscular ones, followed so often by painful lumps dotted about just the parts of the body they want to lie on.

Intravenous medication is still in its infancy. Used with discretion it has a great future before it; and it is a distinct encouragement to its use, when indicated, that it is the one way of giving medicine which demands no accuracy of dilution in dispensing. The practitioner has only to judge, say, how many grains of quinine or urotropin or how many minims of tincture of iodine he wishes to administer; he gives this in the nearest available syringe, without regard to whether it be a 5- or a 10-Cc. one, and in injecting he presses the piston very slowly, thus further diluting his drug with the most abundant, handy, cheap, and surely sterile saline solution he could use.

If Lockhart-Mummery, out of his experience, will tell us what is the dose of

liquor adrenalin to use in order to have the best chance of restarting a human heart that has stopped beating, we can do the rest.

The Diuretic Action of Pituitrin.

In the *American Journal of Physiology* for March, 1921, in the Proceedings of the American Physiological Society, STOLAND and KORB state that the earlier work on the action of the extract from the posterior lobe of the pituitary body lists it as diuretic, while more recent investigators report both diuretic and antidiuretic actions. This difference in opinion seems to be due mainly to the various methods employed.

It was their purpose in their investigation to devise a method which would permit of the collection of urine under conditions that were as near normal as possible; and to note whether either subcutaneous or intravenous injection of pituitary extract would cause any quantitative variation as to either the volume or the nitrogenous content of the urine excreted.

In these experiments a bladder fistula was established in large, healthy, female dogs. In the course of a few weeks the fistula would heal until the opening was about the size of a lead-pencil. The dog was then given a standard diet, placed in a sling, and a special catheter introduced into the fistula. The urine was then drained from the bladder as rapidly as it was secreted into clean flasks, which were packed in ice. Observations were started at 7 A.M. and ended at 7 P.M. Every four hours the flasks were emptied, volume taken, and quantitative determinations of the total nitrogen, urea and ammonia were made. Determinations of the total nitrogen and urea in the blood were also made for the same periods.

Data were obtained on five days previous to treatment with pituitrin. The animals were then treated with 1 Cc. subcutaneous or intravenous injection of pituitrin for five days, and results on urine volume and nitrogenous content compared with control experiments. Following this observations were again made without the pituitrin injections.

In every case they obtained during the first four-hour period after the injection of pituitrin an increase of 30 per cent in volume total nitrogen, urea, and ammonia, in the second period a 50-per-cent increase, and in the third a 20-per-cent increase. On the day following the injection of pituitrin the volume was about normal, but the total nitrogen, urea and ammonia content was 20 per cent below normal the first four-hour period, 10 per cent the second, and 5 per cent the third period. During the three four-hour periods following the injection the total nitrogen and urea content of the blood were lowered about 40 per cent.

The above results seem to show conclusively that pituitrin acts as a stimulant to the kidney in that it produces such a marked secretion of urine that the nitrogenous content of the blood falls far below normal.

The Protection of the Public Against Syphilis.

In the *International Journal of Public Health* (Geneva) for March-April, 1921, VERNES states that of all social diseases syphilis is the most deadly and the most insidious, since it strikes not only the living but the unborn. Its toxin permeates to the very germ of life, changing and destroying it. No more dangerous poison exists. Syphilis empties the cradle and fills the hearse without any one being aware of its presence. Ubiquitous, it is yet invisible, and therein lies the source of its very formidable strength. It is possible to be unaware of syphilis at the time when it is transmissible, and then to be fatally injured in heart or in brain without suspecting the cause. Everywhere in process of extension, syphilis represents in society what the silent uprising of a submarine peak on a great sea route would represent to the navigator. For the future of the race it is a terrible danger, often unrecognized, even by those most actively interested in social hygiene. A philanthropist who has consecrated his energies with regal generosity

to the subject of repopulation was able recently to declare that the fight against syphilis had no place in his programme. It must, however, be recognized that, in nearly all civilized countries, the cry of alarm has been raised and steps have been taken to stem the plague. One could only prophesy success for these attempts if they were organized according to a uniform plan adapted to the end in sight, but on the contrary they follow very different lines of action, and this very diversity betrays the general uncertainty in the combat against syphilis, an uncertainty which, in default of a directing idea, results in a great variety of campaigns each following the prevalent customs and opinions.

In Great Britain, a country of individual freedom, patients obtain treatment where and how they will without any official direction; whilst in Germany, country of disciplined organization, consultation posts, spread all over the land, constitute a veritable network of venereal surveillance and pass on their patients either to private consulting rooms or to public institutions, all at the expense of insurance societies which are interested in seeing that their clients with venereal disease shall be watched and treated as soon as their condition demands it. In Switzerland every town arranges its antivenereal organization as it thinks best, basing its action on the federal law concerning epidemic and contagious diseases. Scandinavia strives uniformly to dry up the springs of evil by applying to the germ of syphilis the same general rules that are applied to any virus of contagion—*i.e.*, the rules of discovery and disinfection. This legislation, while apparently logical, offers evident serious inconveniences—violation of professional secrecy, intrusion into private life, denunciations—only to end with a fatally incomplete result. In the United States the same principles of staying and preventing the diffusion of infection are pushed much further to the point of arresting those suspected of infection, to the quarantining of infected persons, and even to the inclusion of illicit sexual relations amongst the punishable offences.

In short, the conflict with syphilis takes different shape among different people. It is obliged to draw its support from anywhere but from syphilography, since syphilography is powerless to furnish it. It cannot become truly effective without attacking the highest of institutions: justice, professional secrecy, and individual freedom.

Studies of Histologic Changes in Organs Induced by Arsphenamine, by Neoarsphenamine, and by Mercury.

In the *Archives of Dermatology and Syphilology* for April, 1921, SCHAMBERG states that both the arsphenamines and mercury administered in therapeutic doses bring about some structural alterations in organs. These are doubtless ordinarily repaired like the changes that take place in various acute infectious diseases. The chief organs affected by the arsphenamines are the liver, the suprarenals, and the blood-vessels. The effects of mercury, on the other hand, are seen dominantly in the kidneys and in the brain. The pathologic findings and clinical experience would persuade one to utter two cautions: In mercurial treatment watch the kidneys; in arsphenamine treatment watch the liver. To be sure, as stated by Milian, in early syphilis jaundice may indicate either hepatic syphilis or a Herxheimer reaction, and will respond to more vigorous treatment when the less intense treatment has failed. Later in the disease, however, and particularly after the vigorous use of the arsenicals, the development of jaundice should lead to a suspension of all specific treatment.

The treatment of syphilis requires the repeated use of these drugs. When used with circumspection and good judgment harmful results may in large part be avoided. When used unskilfully, without proper examination of the patient and without knowledge of warning signals, unfortunate results may take place. The fact should be emphasized that the body tolerates much larger amounts of arsphenamine

than mercury. One may, for instance, administer intravenously to a white rat fifty times as much arsphenamine as mercury. More mercury cannot be administered because it has too great an affinity for body cells. The therapeutic dose of arsphenamine is infinitely more destructive to the spirochete of syphilis than the therapeutic dose of mercury. The spirochetes in a chancre can be destroyed in a few hours by an injection of arsphenamine; this accomplishment is impossible with a single injection of mercury. Fatalities have occurred both after arsphenamine and mercury. Those after the former are much more tragic and fear-inspiring, for the relation between cause and effect is obvious. Many scores, if not hundreds, of deaths after mercury have likewise been reported in the literature, but they are ordinarily more apt to be slow and insidious and less likely to be incriminative of the therapeutic procedure employed.

In conclusion, he states that he cannot refrain from expressing his opinion that vigorous mercurial treatment is often responsible for arsenical intoxication when arsphenamine and mercury are used at the same time. Large doses of both ought not to be employed synchronously. When the two are used jointly their respective dosages should be inversely proportional to each other. It would appear best to give the courses of mercury subsequent to that of arsenic.

A Technique of Intramuscular (Epifascial) Injection.

In the *Medical Record* of April 30, 1921, STOKES gives the following description of a mode of procedure which has proved serviceable in about 40,000 injections.

His experience with the injection of large quantities of solutions (100 Cc. or more) into the buttocks directed his attention to a phenomenon which suggested that the contents of the so-called intramuscular injection when properly introduced are deposited not within the body of the gluteus maximus or between its fasciculi, nor yet within the subcutaneous fat, but in the areolar tissue on the upper surface of the fascia forming the extension of the fascia lata covering the gluteus maximus. A large quantity of fluid when thus injected, instead of forming a tense induration in the body of the muscle or spreading laterally onto the hip and thigh or appearing at the sacral margin, presents promptly at the lower border of the buttock in the gluteal sulcus. The markedly better absorption thus obtained and the freedom from local irritation even on the injection of a highly irritating drug were demonstrated by the work of Wechselmann and Eiche, who advocated this technique for the comparatively painless and uncomplicated administration of arsphenamine intramuscularly. A similar principle may be employed in the administration of the mercurial preparations into the tissue of the buttock with equally satisfactory results. The technical detail necessary to achieve this end, and the avoidance of other familiar complications of intramuscular injection such as deep and superficial infiltration, embolism, necrosis, and abscess formation, may be briefly described as follows:

Injections into the buttock are given to best advantage with the patient lying prone on a table. Other positions induce tenseness of the tissues, which favors leakage of the injected substance along the needle track, makes a careful estimation of the depth of tissue and the placing of the needle difficult, and also makes it difficult to avoid mechanical awkwardness in carrying out the procedure.

Relaxation after the patient assumes the prone position should be complete. Attention to certain details assists in securing a satisfactory coöperation on this point. The patient should drop his arms over the side of the table. His legs should be placed in a position of moderate internal rotation "toed in." The difference in the appearance of the buttock when the patient attempts to keep the heels together is marked. Dimpling of the lower outer quadrant of the buttock disturbs the anatomical rela-

tions, is a sign of incomplete relaxation, and is the position ordinarily assumed by every patient who fears the introduction of the needle.

The instruments to be used are a 2-Cc. glass Luer syringe and three lengths of needles: one for very thin or flabby buttocks, one for medium, and one for fat buttocks, are necessary. The withdrawal of the piston a short distance to detect the presence of a needle in a vein makes possible the use of a smaller gauge needle than that required when the venous pressure alone is depended on to yield a flow of blood from a misplaced needle. His preference is for 22-gauge needles 1.5 inches, 2 inches, and 2.5 inches from the tip of the hub to the point.

Injections into the buttock should, in general, be given into the upper outer quadrant near its inner angle. If the injection is given into the upper part of the outer quadrant or into the inner quadrant near the sacrum, even a short needle is likely to strike bone, or the injection of the irritant substance above the periosteum or about the roots of the sacral plexus will give rise to induration and pain, and may, as Neisser points out, induce an obstinate sciatica. Injections given into either of the lower quadrants are subject to pressure on sitting, and are correspondingly painful. If administered near the great sciatic nerve a neuritis may result. Such injections, moreover, cannot be deposited on the fascia with the exactitude possible in the upper outer quadrant, and for this reason are likely to give rise either to superficial nodule formation, abscesses, or deep firm indurations.

The syringe and needle may be sterilized with alcohol. The alcohol should be thoroughly expelled from the syringe and the needle wiped with sterile cotton moistened with alcohol. The emulsion is then aspirated into the syringe through the needle which has been previously attached, and the needle is again wiped. The syringe is grasped in the right hand. The left hand is placed flat on the buttock and with moderate pressure is drawn firmly downward toward the patient's heel, thus flattening and fixing the tissues. The syringe is introduced to its full length by a quick stroke at an angle of approximately twenty degrees from the vertical in a sagittal plane, with a slight inclination inward. The removal of the left hand slightly increases the slant of the syringe. During the process of introducing the needle the piston must be controlled by the pressure of the index-finger against it above the barrel, to prevent the leaking of a solution or thin emulsion.

As soon as the needle is introduced the syringe is steadied with the left hand while an attempt is made to aspirate by pulling upward on the piston with the right hand. This attempt should be continued for at least ten seconds. This in his experience is an entirely safe and much more trustworthy method of detecting puncture of a deep vein or capillary than is the mere detaching of the syringe or the introduction of an empty needle in the expectation that the pressure of the blood in a capillary vessel will cause a backflow of emulsion or of blood, as the case may be. He has never seen an accident of any type occur if the aspiration step in the technique was rigidly adhered to. As soon as it appears that nothing can be aspirated from the deep tissue about the needle point, the contents of the syringe may be injected, the right hand maintaining the proper angle of the needle.

It is not necessary in this technique to use a sign, such as Wechselmann's torsion sign, for demonstrating that the needle point is near or on the fascia. The site of the injection, the length of the needle when properly adapted to the type of buttock, the fixation of the tissue with the left hand, and the position of the syringe when introduced, soon become matters of habit and seem to place the injected material in such a way that induration is a very unusual occurrence. The flow of injected material into the tissue should be free and the needle point should not "feel" as if stuck in a board. A little experience soon enables one

to control the technique by recognizing the deep, painful lemon or orange sized induration that has followed on too deep injection (intramuscular) and the hazel-nut to hickory-nut sized nodule in the skin or panniculus secondary to too superficial injection or to leakage along the needle track.

Deposition of injected material along the needle track is avoided: first, by securing complete relaxation; second, by using a small caliber needle; third, by completely emptying the syringe before withdrawal; fourth, by a rapid withdrawal; fifth, by quickly pushing the tissues which have been drawn downward by the left hand back to their normal position like a sliding valve the moment the needle is withdrawn; and sixth, by light massage with a cotton pledget over the site of puncture, which results in a rapid flattening out of the injection mass in the areolar tissues over the fascia. In buttocks which have been rendered fibrous by repeated courses of intramuscular injections, leakage cannot be prevented, and the intramuscular injections must ultimately be abandoned.

Attention to several additional details materially contributes to a uniformly satisfactory technique. It goes without saying that the buttocks should be used in alternation for injection. Needle points should be of a rather long bevel and exceedingly sharp. The use of a needle with a bent point is very painful. In wiping the needle a bent point can be detected by a grating sound and feel as it passes over the cotton, often when it is scarcely visible. The operator may unconsciously turn the point of his needle by touching it against the bottom of his bottle of emulsion or solution when filling the syringe. For this reason every movement of the needle should be carefully controlled and it should never be brought into contact with hard substances. A needle which has been allowed to become rusty, corroded, or pitted will also bring a protest from the patient.

The breaking of a needle is one of the most unpleasant complications of intramuscular injection and may be due, first, to an incorrectly placed puncture which causes the needle to strike on bone, fracturing it at some point along the shaft; second, to a sudden movement on the part of the patient, especially if the point is caught in the fascia or lies in the muscle; and third, to weakening of the needle by internal or external corrosion. The first cause seldom operates except as a result of gross misjudgment. The second can usually be avoided by an effort to secure the coöperation of the patient and by guarding against sudden movement in those in whom coöperation cannot be expected (children for example). The third cause can be controlled by frequent inspection of needles with a forcible attempt to bend the shaft on the hub. If a steel needle is used for corrosive solutions, its life will be short and inspection must be frequent and critical.

If a needle breaks do not exclaim or discuss the situation with the patient or the nurse; second, keep the left hand in position until an attempt can be made to recover the needle. The usual point of fracture is at the juncture of the hub and shaft and with an assistant at hand the fragment just beneath the skin may sometimes be recovered by a small incision and with the aid of a hemostat if the operator keeps his presence of mind. On the other hand, the moment the left hand is released from the buttock the needle is lost and can usually only be identified by the Roentgen ray and removed through an extensive surgical incision. Such situations are so embarrassing that the finest types of steel and tempered gold needles should be used for intramuscular work.

In the use of insoluble suspensions for intramuscular injection a word of caution as to the preparation of the suspension is important. Concentrated suspensions requiring small amounts for each injection are often less painful than thin suspensions. An insoluble preparation made up in a fluid base settles rapidly, and the collected powder can only be returned to suspension by from five to twenty minutes' persistent

vigorous shaking, and kept in suspension by shaking after each injection. The suspension may appear entirely homogeneous when a considerable portion of the solid material still adheres to the bottom of the bottle. A satisfactory test of complete suspension consists of shaking until none of the suspension can be recognized in the groove at the juncture of the sides and bottom of the bottle when the bottle is inverted.

If blood is obtained on aspiration after the introduction of the syringe, even in the minutest amount, the syringe should be withdrawn and the procedure repeated 1 cm. or more from the site of the unsuccessful attempt. To continue the injection in the face of a return of blood or even a tinged suspension may be attended by fatal consequences from embolism.

Superficial indurations or nodules may be treated by painting them once or twice a week with iodine and requesting the patient to pinch and massage them between the thumb and forefinger. Deep indurations attended with pain from injection below the fascia are much relieved by prolonged hot applications and massage. Indurations seem to occur with special frequency in certain subjects, especially the obese, and are sometimes unavoidable even with the best technique. Each node represents a certain amount of encapsulated mercury which may be abruptly released for absorption by trifling trauma, such as that of sitting down more heavily than usually. The sudden onset of salivation in patients who have not had intramuscular injections of insoluble mercurial salts for a considerable period may be to some extent a result of technical errors which have interfered with absorption. There can be no object in continuing a method of administration in which persistent nodule formation, even with a careful technique, shows that the drug does not absorb.

Pain referred down the leg has always in Stokes's experience been evidence of the technical error of injecting too deep or too near the sacral plexus and the great sciatic nerve.

Pulmonary embolism following the use of insoluble salts, such as mercury salicylate, calomel, and gray oil, probably cannot be absolutely avoided, but should be an excessively rare occurrence. The symptoms of pulmonary embolism may vary from a slight and transient cough after the patient rises from the table to evidences of extensive pulmonary infarction with severe and persistent cough, rise of temperature, pleural irritation, and occasional pneumonic complications. Pulmonary embolism may occasionally supervene some hours after an injection made in accordance with the strictest technical exactness. Cerebral embolism is exceedingly rare.

Abscess formation he has seen only twice in 40,000 injections. The abscess is usually sterile and resolves promptly on evacuation. A certain percentage of deep indurations doubtless undergo central softening, but under rest and hot dressings the process subsides.

The Antidiuretic Effect of Pituitrin in Diabetes Insipidus.

In the *Ohio State Medical Journal* for April, 1921, MICKLETHWAITE states that the difficulty with this line of treatment is that the effect is not lasting and that two injections daily are necessary to keep down the quantity of the urine and to raise the specific gravity. The practical application of this fact is at once manifested in life insurance and other diagnostic examinations.

The control of diabetes insipidus by the use of pituitary extract has been dealt with recently by Barker, Hodge, and Mosenthal in rather exhaustive papers. Davidson refers to some interesting observations by Kennaway and Mottram upon the antidiuretic effects of pituitary extract in diabetes insipidus, with a detailed account of two cases, and in view of the comparative rarity of this condition he records the notes of a case under his own care in which injections of pituitrin were given and observations made upon the total output of urine in the twenty-four hours, as well as notes on the amount and specific gravity of

the samples collected at frequent intervals after the injections.

The injections were always followed by an action on the bowels and on the first occasion by vomiting, but except for this no untoward effects were observed. Apart from the discomfort and annoyance of the symptoms the patient suffered no inconvenience beyond that of a slight bronchitis, which yielded to treatment. There were no symptoms or signs to suggest any associated disorder of the pituitary gland.

Davidson's case was a man passing a urine of 1.002 with polyuria. He received one ampoule of pituitrin (S) twice a day hypodermically. The urine was decreased and its specific gravity rose to 1.012.

Micklethwaite's case was an ex-soldier, aged thirty-five. He had always been a healthy man until he was invalided from the Salonika front in the winter of 1917 with bronchitis and nephritis. He was sent back to England, and while in the hospital at Malta, en route, he began to complain of polyuria for the first time. He was treated for bronchitis and asthma, but no special attention was paid to the other condition.

On admission to the hospital his condition was as follows: He was a healthy looking, well-developed man. He complained of some cough and a great thirst, and continued polyuria. On examination he had signs of some bronchitis; medium rhonchi were audible all over both lungs without moist sounds; there was a moderate amount of expectoration. He was treated for this with belladonna and stramonium, and the physical signs in the chest cleared up. The heart was normal. There was no sign of edema of the face or legs, nor was there any albuminuria. His visual fields were not diminished; the appearance of the fundus oculi on both sides was normal. A skiagram of the skull showed no abnormality of the sella turcica. From the time of admission he suffered continually from intense thirst, and was allowed as much water as he wanted day and night. The urine was pale, acid in reaction, of low specific gravity (1000), and contained no sugar or albumin. The amount passed per twenty-four hours averaged just over 300 ounces.

It was decided to administer hypodermic injections of pituitary extract in order to observe its effects upon the diuresis, and to see whether after continuing the injections for some time any permanent or lasting effect was obtained. The antidiuretic effect of the pituitrin was such as to cause an appreciable diminution in the total excretion of urine in the twenty-four hours. The effect was much more pronounced during the period shortly following the injections.

Several doses of pituitrin were given by the mouth, but without any appreciable effect upon the amount of urine secreted.

The Nutritive Value of Soya-bean Flour as a Supplement to Wheat Flour.

In the *American Journal of Physiology* for April, 1921, JOHNS and FINKS state that bread made with a mixture of 25 parts of soya-bean flour and 75 parts of wheat flour contains a protein mixture and water-soluble vitamines adequate for normal growth. A similar bread containing 15 parts of soya-bean flour and 85 parts of wheat flour likewise furnishes adequate proteins and water-soluble vitamines for normal growth.

These mixtures of the soya-bean and wheat proteins were found two or three times more efficient than the proteins from wheat alone.

Anesthesia in Obstetrics.

In the *Ohio State Medical Journal* for April, 1921, the editor makes the following note in reference to Arthur H. Bill's article on this subject:

In striving for the ideal in the pain-relief of labor it is common sense to know all methods intimately, to be prepared to resort to any, and to select the best features of all according to the demands of the particular labor which is being conducted, the

condition of the mother and unborn child, as well as the facilities at hand. At the present time labor may indeed be made very comfortable. The pains of the first stage may be controlled by the judicious use of alkaloidal amnesia. The pains of the second stage may be mitigated by the use of nitrous oxide or ether, and the stage of expulsion by a combination of both. Bill again sounds the warning that pregnant and laboring women are not immune to the dangers of anesthetics when carelessly given. He has discarded the use of chloroform in labor and substituted the use of ether or nitrous-oxide-oxygen according to indications. The administration of anesthesia during labor is an art in itself, and is best accomplished by an obstetrician who is thoroughly familiar with anesthesia or an anesthetist who knows much about obstetrics.

Basal Metabolism as an Index of Treatment in Diseases of the Thyroid.

In the *Boston Medical and Surgical Journal* of April 7, 1921, LAHEY and JORDAN state it is their opinion that there is hardly a surgical disease in which caution is as necessary as in the cases of marked thyrotoxicosis. As it approaches the higher levels of toxicity, as indicated by clinical signs and increases in metabolic rates to high levels, each case should be individualized and no longer looked upon as being a member of a group. After such cases have reached the more intense stages of thyroid intoxication, they no longer conduct themselves by rule. This statement is more or less true of hyperthyroidism as a whole, but is particularly characteristic of the intensely toxic cases. After an extensive experience with thyroid cases, they feel able to prophesy with relative certainty the course and reaction of mild and moderate degrees of thyroid intoxication to various surgical procedures, but have by no means the same degree of assurance regarding the intensely toxic cases. It is because of this unknown capacity for unfavorable reaction on the part of severely toxic cases that extremely cautious advance should be made. First, the degree of reaction to the slight discomfort and apprehension which goes with the estimation of basal metabolism, next the reaction to a visit to the operating-room and short gas-oxygen anesthesia, and finally, based upon this data, the ligation of a single thyroid pole. Having advanced so far, they have accumulated sufficient data upon which to base with reasonable certainty a decision as to the probable outcome with further surgical procedures.

Thyroid toxicity, if for practical purposes we consider the disease in terms of toxic thyroid products, is represented by increased basal metabolic rates, and there can be little question as to what to do. One has but to observe the charts shown and note the metabolic rate before operation—the progressive drop in the metabolic rate and pulse rate after ligation and again after partial thyroidectomy, together with the progressive clinical improvement in the patient, going hand in hand in most instances with the drop in metabolic rate—to be convinced that metabolic rate quite accurately represents degree of toxicity.

That basal metabolism represents true terms of toxicity, which in turn may be used to estimate ability to withstand surgical procedures, is as uncertain as the level of basal metabolic rate alone is quite undependable, and in fact often misleading as a means of prognosticating the seriousness of the patient's state and her ability to endure any surgical procedure. They have had surgical experiences with patients showing metabolic rates at both extremes, in which the course and results of the operative procedure have been entirely out of accord with what might have been expected from the metabolic rate.

They have, for example, operated upon patients with a basal metabolic rate of + 26 with a hyperthyroidism of long standing, and seen an extremely well-marked operative and postoperative reaction. On the other hand, they have operated upon patients with metabolic rates around + 60 or over, but with a hyperthyroidism of

short duration, who have shown much less operative and postoperative reaction than have the patients with a rate of + 26 as spoken of above.

It is their feeling that one must consider—in estimating the operative risk—not only the degree of toxicity, but also the cardiac reserve as estimated by the rate, rhythm, and character of the pulse wave, by the length of time the disease has been present, and by the history and signs of past or present indications of unsettled compensation, and the destructive effect of the disease on other structures, as indicated by varying degrees of nervousness, tremor, and loss of weight.

Surgical and Genito-Urinary Therapeutics

The Treatment of Congenital Hypertrophic Stenosis of the Pylorus by Rammstedt's Operation.

RAMSAY *(British Journal of Surgery,* April, 1921) reports on 20 cases with a mortality of 50 per cent. He states that the most frequent causes of death after operation are diarrhea and high fever. He also records recurrences of symptoms. He notes that the operation of dividing the hypertrophied muscular coat in the axis of the pyloric canal, leaving the mucous membrane intact, and using no sutures to close the gap, was first described by Rammstedt in 1912 and was evolved by accident rather than by design.

The stomach is washed out before operating. An incision is made 1¼ to 1½ inches in length, in the middle line, extending downward from the tip of the ensiform cartilage. As soon as the abdominal cavity is opened it is well to secure the cut edges of the peritoneum before they contract and thus avoid delay when the time for closure comes. When the lower edge of the liver has been hooked upward, the stomach appears in the wound. The diagnosis having been confirmed by feeling the pyloric tumor with a finger introduced into the abdomen, this tumor is brought out of the wound; in some cases it can be hooked up by the examining finger; in others, pushing the stomach backward and to the left may cause it to present; or, in the case of a greatly dilated stomach, it may be necessary to exert gentle traction upon the exposed part of this organ and so bring the tumor within reach. The pylorus being delivered, the extent of the hypertrophy is carefully defined by palpation, and with the tumor held firmly in the left hand a longitudinal incision is made upon its anterior surface in the relatively bloodless area lying between the terminal branches of the vessels running along its upper and lower borders. The incision should divide the whole of the hypertrophied muscle; it should be deepened carefully at first in the middle or thickest part, the left hand drawing apart the edges of the incision until the deepest part of the muscle is divided and retracts, exposing the thick white mucous membrane, which at once protrudes. The incision is then prolonged toward the stomach and duodenum until all the thickened muscle is divided. Great care must be taken not to wound the mucous membrane, especially at the duodenal end of the incision, since here the hypertrophy ends abruptly and protrudes into the lumen of the intestine, producing a cul-de-sac of duodenal mucous membrane which may easily be injured. When the muscle has been completely divided, the edges of the incision retract and the redundant mucous membrane bulges freely into the gap. Hemorrhage in the form of oozing may occur, especially at the end of the incision which encroaches on the stomach; this can usually be controlled by hot sponging, but if, as sometimes occurs, a definite bleeding point is responsible, it should be under-run and ligatured with fine catgut.

The patency of the canal may be tested by gently squeezing the stomach, and this precaution also serves to demonstrate the absence of macroscopic perforation of the mucous membrane. The pylorus is now returned to the abdomen, and the liver allowed to fall into place.

The closure of the abdominal wound is begun at the lower end, since it is here that protrusion of abdominal contents is most likely to occur; a continuous suture of fine silk closes the peritoneum and aponeurosis in one layer, and a continuous blanket suture of silk or fishing-gut is used for the skin. Dressings having been applied, the patient is returned to a warm bed, saline with brandy is given per rectum, and feeding is begun as soon as possible.

Spinal Curvature in Growing Children.

This condition is so little understood by the general profession, so often overlooked, and treated so spasmodically or ineffectually, or in a manner which, from the restrictions it implies, make it prohibitive to the average indulged child, and as to its underlying causes is so vaguely classified, that an article on the subject by a recognized authority, one whose sound common sense has not been obscured by special training and one who has been especially concerned in the study of ultimate results, is particularly helpful.

BRADFORD (*Boston Medical and Surgical Journal,* May 19, 1921) states that if a growing girl is brought to a doctor's office for advice as to the treatment of a slightly projecting shoulder or hip, the surgeon will often find it difficult to form a definite opinion as to the probability of benefit to be expected to follow treatment or the danger of increasing deformity if thorough treatment is not followed.

The treatment commonly employed in the severe forms of the deformity is of doubtful advisability in slight cases, while simple postural or gymnastic measures cannot be relied upon to correct twisted bone. To enable the physician to form his opinion more definite information is wanted.

In a growing child with round shoulders, the spine is either stiffened abnormally in some parts of the column, or the flexibility is normal. The same is true in side curves. These differing conditions need different treatment, and if commencing scoliotic rotation is present, more rigorous measures are needed.

Bradford states that records of spinal flexibility can be made of sufficient accuracy by marking on a plate of transparent glass, against which the patient's back rests when he or she is standing up straight, and also when leaning to both sides. A pencil mark on the spinous processes is seen through the glass; this is marked on the glass, and a record of the side flexibility of the column is made. This method will help in detecting commencing stiffness of spinous ligaments, localized irregularly shaped cartilage or bone. In recording anterior curves another method is needed, as the projecting scapula masks the real spinal lines of the patient as seen from the side.

These observations will enable the surgeon to determine whether it is necessary to stretch shortened tissue or whether the muscular or postural treatment will be sufficient. The curves of the flexible spine will disappear when the patient is recumbent. In the erect position the flexible spines sag under their load if the muscles are weak or easily tired. The principles of treatment are that easily tired backs should be properly rested, weak muscled backs should be strengthened, and stiffened parts of the column should be made as flexible as possible.

Any one familiar with inspection of the schoolchildren of our communities is aware of the faulty figures too frequently seen. This is by no means more noticeable among the poor; in fact it has appeared, in some localities, that the richer class is poorer in respect to the vigor of the carriage, even in childhood.

Few, if any, American physicians would condemn a healthy growing girl to a year's exile of half-bed life and gymnastics, or to six months of a spinal couch in a special institution, or to the wearing for years of clumsy, heavy corsets, merely because the

bared back showed to apprehensive parents an abnormality in contour, with the only promised benefit from such rigorous treatment that the curvature would be prevented from increasing.

Spinal curvatures, in most instances, are not to be regarded as a definite disease to be treated medically or symptomatically, but as a fault in growth. Treatment is not simply the correction of the curves so much as the guidance of the growth to a normal standard of carriage or trunk shape.

The chief causes determining spinal curves may be understood without difficulty: The spine of the new-born is flexible, bending in several directions, forward, backward, sidewise, and capable of twisting on itself to a limited degree. In the upright position it curves and cannot be held erect until the muscles gain their normal strength. With strengthened muscles, the erect attitude is assumed with a balanced spine with slight normal, forward and backward curves, adequate flexibility, and proper rigidity for erect locomotion and adjustment to changes of position. Abnormal curves come if there is muscular weakness, causing undue sagging of the spine, or if curved attitudes are too often or too long assumed by an inadequately resistant spinal column. What these curves will be depends upon the extent of the load carried and its direction. Abnormal curves vary according to definite classifiable types, namely, forward and backward curves, side curves, single and double curves with twists, curves with stiffening tissues and changes in the shape of the bone structures.

The causes of differing abnormal curves are many and not easily recognized: their action is gradual and may be checked by increased structural resistance of the vertebral bodies. In the progressing cases the abnormal curves increase until they become more or less fixed with structural changes of ligaments, fascia, muscle, cartilage, and bone. The rotation of the vertebræ as the abnormally curved column is subjected to downward pressure beyond its resistance, drags with it the connected ribs, and characteristic deformities result.

While in the earlier stages the curves and twists are more or less correctible, they may become rigid and unyielding with marked structural changes from abnormal strain and pressure.

For the general practitioner, and the management of spinal curvature cases, a practical grouping will be of convenience:

1. Habit curves in healthy backs.
2. Weak backs, with weak muscles or back tissues.
3. Twisted backs, with varying resistance to connecting pressure.

The physician will be aided in forming his opinion as to the proper management of cases by informing himself as to the child's rate of growth, ratio of weight to height (compared with normal standards), the child's general condition, habits of activity, and commonly worn clothing. He should bear in mind that while certain variations in the forward and back curves of the spinal line may fall within the normal limit, marked hollow backs, flattened chests, projecting shoulder-blades, are not normal, and that a lack of symmetry in the slope of the shoulders, the side lines of the trunk and hip, as seen from behind, is not normal, nor is a difference in the distance of the tips of either scapula from the spinal line (that is, the line of the spinous processes) normal. The spinal line seen from behind is straight in the erect standing position, and bends equally to either side in side bending.

Habit curves should not occur in healthy children with a normal environment. If observed in children of good physical development, faulty attitudes in sitting, ill-suited chairs commonly used, indolent habits, or constricting clothing are all to be considered as possible contributing causes. The best treatment for this condition is a daily drill of simple setting-up exercises, with removal of any faulty conditions of seating or clothing. Specific directions for active play are essential. The fact that the greater part of the waking day in a child's life is spent seated with the back muscles but little exercised, the back partly supported and partly stretched, the child leaning against an ill-fitted chair-back, cannot be ignored.

Whether backs are weak from a lack of bone tissue resistance, or lack of firmness of ligament, or more from a lack of muscle tone, the condition of weak backs in children needs treatment.

Where there is a twist as well as a curvature, mechanical correction is required, either by intermittent or constantly applied pressure. This calls for specialized treatment.

In attempting to stretch spinal curves, the load should be removed from the spine. This is done most conveniently to the patient when in the semirecumbent position, and properly adjusted straps for head and side pull, attached to pulling weights, can be arranged to give correcting pressure for any desired time and to any extent.

A board sloped to any desired angle, furnished with a seat to prevent the patient from sliding down on it, enables a tired back patient to rest and offers a proper position for correctly stretching. If upon the trunk of a patient lying on the reclining board a short board is placed, and the sides are strapped to the reclining board, any amount of pressure can be made on the twisted and projecting ribs and correction made on the spinal rotation. This intermittent correcting pressure is suitable for slight degrees of twists in young patients, to whom the constant pressure of plaster jackets is inapplicable when the muscle weakening effect of a heavy corset cannot be disregarded. Daily rest of the column can be furnished by the prescribed use of the reclining board.

Elaborate gymnastics and postural movements requiring supervision are not well suited for home treatment, which necessarily forms an important feature in the treatment of so chronic an affection as spinal curvature.

Besides the usually prescribed dumb-bell and weight-pulling exercises, patients with spinal curves should be directed to carry daily, for a stated time, upon the head, a basket containing specified weight. This gives both poise and strength to the spinal column and is an exercise suited to home direction.

Even after spinal muscles have been strengthened and abnormal stiffness of spinal curves has been made more flexible, the patient often needs to avoid habitual faulty positions. This may be done by conscious efforts on the part of the patient or may require mechanical restraint. Cumbersome, heavy and disfiguring appliances are to be avoided. The appliances are either restraints or are to exert some correcting pressure.

A simple unnoticed check rein can be used to restrain a round-shoulder attitude, the method of applying which is more satisfactorily figured in a picture than is the description set forth in the text.

A stiffer correction can be provided by a light spring steel bar cut long enough to reach from the neck to the buttock, and to this is fastened a shorter cross-piece at the level of the axillary line; webbing straps are connected with the ends of the steel bars and passed around the shoulders, hips and neck and buckled to an abdominal cloth piece, thus securing an erect attitude as long as this brace is worn, which can be done under the clothing.

In side curves, a similar steel spring strip can be used, but the cross-piece should extend on the side of the back only and be attached to a strip of webbing, which, passing around the lower shoulder, is connected to the top of the steel bar. At the lower end of the steel another steel strip is fastened, extending from the middle of the back to the rim of the ilium. If to these broad webbing bands are attached and passed around the hip on one side, and the prominent shoulder on the other, and tightened in front, a satisfactory correcting pressure is secured for cases of slight side curves.

Bradford states that cases of flexible curves without structural changes in reasonable good health, with either anterior or side curves, can be expected to be restored to normal contour under proper guidance. This result can also be expected where some abnormal stiffness is present, though special pains may be required to overcome faulty stiffness. Even with rotation, projecting shoulders or hips in young children can be improved. In healthy adolescents these

curvatures and deformities can be prevented from increasing.

Bradford closes his article with the conservative statement that the surgeon can avail himself of a number of serviceable measures which enable him to meet the surgical indications of a slowly changing distortion, checking its progress, and, in some cases, correcting deformity.

Tetanus in the British Army During the European War.

CUMMINS *(Journal of the Royal Army Medical Corps,* May, 1921) reports that although the hope was entertained at the beginning of the war that tetanus might be successfully controlled, the tetanus cases, although greatly diminished in numbers, continued to occur. The prophylactic administration of antitoxin became almost universal in 1914, when adequate supplies of antitetanic serum became available, and so continued up to the conclusion of hostilities. This universal inoculation deprived statisticians of any large uninoculated "control group."

The following rules for the prophylactic administration of antitetanic serum were drawn up by the committee for the study of tetanus in the British army and have given satisfactory results.

The first prophylactic dose should be given as soon after wounding as circumstances permit, and should be not less than five hundred U. S. A. units of antitoxin.

As there is both clinical and experimenal evidence that the immunity conferred by an injection rapidly declines from about the tenth day onward after administration, and as the appearance of a wound affords no indication whether it is infected with tetanus or not, it is recommended that all wounded men should receive at least four injections of antitetanic serum—a primary injection given at or shortly after the time of the wound, and three others.

The second injection should follow the first at an interval of seven days. The third and fourth injections should follow at as nearly as possible the same interval of time.

While these rules are thoroughly sound, they are not always easy to carry out in strict detail when very heavy fighting is in progress. The initial dose is naturally the most important, and it has been found possible to give it in practically every case within the first twenty-four or forty-eight hours after wounding. The second and subsequent doses are of undoubted value, but they are less easy to insure. It is often difficult to arrange for reinoculation at the right interval during the various stages of evacuation of a wounded man from the front to the base and thence to home territory. Again, the condition of the patient may be such that the surgeon may hesitate to add to his burden by even so much as an injection of serum. But it has been found possible to give the reinoculations at or about the intervals recommended, in the majority of cases with very satisfactory results. Whether these successive injections be given or not, one rule is of cardinal importance:

A precautionary dose of antitetanic serum (500 units) should invaribly be given at the time of any operative measures at the site of the wound.

But while the effect of the routine use of prophylactic injections of antitetanic serum has been so great in diminishing the case-incidence of the disease, its value is by no means confined to mere prevention of tetanus. It can be confidently claimed that these injections have acted beneficially in at least four ways: In reducing the case-incidence of tetanus; in diminishing the case mortality; in extending the incubation period; in modifying the severity of the disease.

In 1914-1915, Sir William Leishman recorded in the hospitals of the British Expeditionary Force, France, 178 observed cases with 140 deaths, a mortality of 78.2 per cent, while Sir David Bruce, collecting his figures from hospitals in Great Britain, reported 231 cases with 133 deaths, a mortality of 57.7 per cent.

Adding these early and late cases together as a sample of the tetanus mortality of the first year of the war, there were 410 cases

with 273 deaths, or a mortality of 66.6 per cent.

In 1916-1917, in a series of 376 cases reported from France by Colonel Cummins and Major Gibson, there were 252 deaths, or 67 per cent. For the same period Sir David Bruce reported, from England, 400 cases with 79 deaths, or 19.7 per cent. Adding these early and late cases together, we get a record of 776 cases with 331 deaths; a mortality of 42.6 per cent.

The total mortaliy in a third group of cases from British hospitals in France and England in 1918 shows a slight rise to 48.8 per cent, owing, doubtless, to the unfavorable conditions for the treatment of wounded necessitated by the retreat in the Somme area in March.

Of fifty cases of tetanus in non-inoculated persons arising in France in 1918, only nineteen were in men wounded in battle. Of these nineteen cases sixteen died, a mortality of eighty-four per cent; just such a mortality as characterized the tetanus of older wars before serum was introduced.

In the same period 136 wounded and inoculated men developed tetanus. Of these seventy-five proved fatal—a mortality of 55.1 per cent.

Another significant comparison may be made between those to whom antitoxin was given within twenty-four hours of wounding and those to whom it was given at a later period.

Of 269 men inoculated within twenty-four hours of wounding, 170, or 63.2 per cent, died.

Of sixty-nine men inoculated at a longer interval than twenty-four hours after wounding, fifty-three, or 76.8 per cent, died.

Again, where cases have received only one protective inoculation, the mortality has been less amongst those who received the larger doses. For instance, in 1917, there are records of 119 tetanus cases in men to whom a single dose of 500 units was given; of these, nintey died, a mortality of 75.7 per cent. In the same period thirty-nine cases had received 750 units or more; of these, seventeen died, a mortality of 43.5 per cent.

It may be stated as a proved fact that the mortality of tetanus was definitely less in those cases to which prophylactic inoculations had been given, and especially in those to which it had been given early and in large quantity.

The conclusion seems inevitable that the use of antitetanic serum has been a factor of the greatest importance in prolonging the incubation period of tetanus.

We are, then, in a position to state definitely that the prophylactic use of antitoxin not only diminishes the case-incidence of tetanus, but also leads to a prolongation of the incubation period and a reduction of case-mortality.

Captain W. J. Tulloch, R.A.M.C., working for the war office committee for the investigation of tetanus, has been able to show, by serological differentiation, that there are at least four separate types of tetanus bacilli operative in war wounds. Of these, Type I corresponds to the organism employed for the preparation of the toxin used in manufacture of antitetanic serum.

Tulloch has shown that, while serologically distinct, all four types produce exactly the same toxin. The antitoxin in general use is, therefore, equally effective in neutralizing the toxin in all four types of infection.

But further work by this investigator has pointed strongly to the conclusion that it is not only the toxin that matters, but that the power of invasion by the bacteria themselves plays an important part in the production of tetanus. Tulloch has isolated all his bacterial types from both tetanus cases and also from septic wounds in patients in whom tetanus did not develop.

Figures appear to indicate that, when tetanus develops after excision of the wounds, it tends to assume a benign rather than a severe type. It is not desired to claim too much for these very small figures. All that can be said is that, as far as they go, they support the conclusion that effective surgical intervention helps very largely in lessening the incidence, the severity, and the case-mortality of tetanus.

This conclusion is so obviously in agreement with bacteriological and physiological facts that it is unlikely to be seriously questioned.

It is now generally admitted that, once tetanus toxin has entered into combination with nerve tissue, the presence of antitoxin in the circulating blood and lymph cannot lead to dissociation of the toxin.

It is known that the presence of antitoxin in the circulation can neutralize its equivalent of circulating toxin.

The experiments of Meyer and Ransom have shown that the toxin travels along the axis cylinders of motor nerves. Teale and Embleton, while confirming this observation, have shown that the toxin also travels along the perineural lymphatics. Antitoxin cannot travel along the axis cylinders, but it can and does travel along lymphatic vessels and circulate in the blood stream.

It seems probable from these considerations that the most that can be hoped from antitoxin in treatment is that it will, if given in sufficient quantity, neutralize all circulating toxin.

Whether recovery can take place will depend on how much toxin has already combined with nerve tissue, and how far the antitoxin can neutralize the poison formed at the infected site and prevent its effective passage along motor nerves. One very hopeful feature is the success attained in preventing a fatal issue in animals, to which a lethal dose of toxin has been given, by means of subsequent injection of antitoxin.

Dr. F. Golla, from a careful study of a series of reported cases, shows that, in cases of tetanus in men to whom no prophylactic injection has been given, but who were treated with antitetanic serum after the development of the disease, the rate of mortality approaches closely to that of tetanus without such treatment, tending to show that the employment of antitetanic serum in treatment is of no value at all.

Sir David Bruce, whose successive series of analyses of tetanus cases in hospitals in England have been such a valuable contribution to this subject, remains, at the end of the war, uncertain whether serum therapy in tetanus is of any use.

Taken as a whole, the figures do not amount to evidence of the least statistical importance in favor of serum therapy. As to the different routes of administration, practically every case received serum in more ways than one, but very general use was made of the intrathecal and intramuscular routes.

There is no evidence to show that one method was markedly superior to another, but the tendency was evidently to conform to the recommendation of the War Office Tetanus Committee and make use, for preference, of intrathecal and intramuscular injections.

The conclusions which the author draws from the information gained upon the subject of tetanus in the late war were as follows:

The almost universal use of antitoxin for prophylactic inoculation has greatly diminished the incidence of tetanus as a complication of war wounds.

There is reason to hope that, by following up and applying the new knowledge gained by Dr. Tulloch as to types of tetanus bacilli, it may be possible to still further increase the prophylactic efficacy of antitetanic serum in the future.

The prophylactic use of antitoxin has not only reduced the incidence of tetanus, but has also led to a modification of the clinical type of the disease. Tetanus, in inoculated persons, tends to assume a milder form characterized by a longer incubation period and a greatly decreased case mortality. "Local tetanus," without trismus, is common.

The improvement in surgical technique, notably the introduction of early excision of wounds, has favorably influenced the incidence, severity, and mortality in tetanus cases.

There is as yet no statistical evidence to show that antitoxin has been valuable in the treatment of tetanus.

Good results from serum therapy have been claimed by many surgeons, and recent experiments on animals show clearly that under controlled conditions serum therapy can cure tetanus even though administration had been withheld until the onset of spasm. It is therefore advisable to give every tetanus patient the chance of benefit from specific treatment.

If serum is given it should be given in large doses and as early as possible after onset. Intrathecal injections should be given, and these should be supplemented by intramuscular and subcutaneous administration.

Fractures.

Incident to the newer knowledge gained by fluoroscopic and radiographic studies of broken bones, a clearer concept of the factors which impair joint function, a better understanding of the mechanics of the bone from the standpoints of support, leverage, and free motion, and with a large recorded clinical experience, the result of the recent war, the knowledge concerning the proper treatment of fracture, and the results which may reasonably be expected in skilful hands, has advanced far beyond that which is suggested by the treatment thus commonly employed in many hospitals of good standing and under otherwise intelligent management. What has been most needed for years in the consideration of fractures and their treatment is a careful summing of results, from the standpoint of both function and cosmetics. Such a summing has been largely stimulated by industrial surgery, which when it is efficiently conducted saves employers of labor many thousands of dollars. Moreover, the larger industries are the most prompt to advocate and practice measures which are helpful to their employees. Hence, there can reasonably be expected, in a comparatively brief time, a somewhat uniform and efficient method of treatment, and a recognized standard of results, which will insure a general if not universal adoption of the approved measures, and will rob these injuries of the greater part of their present permanent crippling effect. In this relation a number of articles in the *American Journal of Surgery* for May, 1921, are pertinent and helpful.

BLAKE, writing on "The Treatment of Fractures of the Humerus by Suspension and Traction," holds that this method is easy to apply to fractures of the humerus, not requiring nearly as much skill as treatment by splints. Immobilization is achieved by traction, aided to a certain extent by the way in which the limb is suspended. Although the fragments are efficiently immobilized one upon the other, yet motion is permitted at both the shoulder and the elbow.

The gallows frame, consisting of post and arm, is adequate. A full description and illustration of his method are given. To the arm traction is applied, and to the forearm suspension. They can be varied according to indications. He claims for this suspension treatment earlier function caused in the main by better nutrition, due to maintenance of normal circulation.

Hitzrot in dealing with fractures of the head and the neck of the radius gives a useful classification of these injuries. For the marginal fractures he splints the arm with the elbow flexed to a right angle, with the forearm in the middle position between full pronation and supination and kept at rest during the stage of acute exudation and reaction in the superior radio-ulnar joint: usually for five days. Thereafter the arm is rubbed, baked, and the patient is encouraged to use it—that is, to make active movements in flexion and extension within the limits of pain. As soon as the patient finds that these movements can be executed painlessly (and this usually on the tenth or twelfth day after injury), the splint is removed and movements of pronation and supination encouraged. The treatment is continued from four to six weeks, after which time more active movements on the part of the patient, with use of the arm, may be advised. Function is usually restored in eight weeks. The ultimate loss of movement is slight, about 5 degrees of extension and from 5 to 10 degrees of supination. The splint used is one of molded plaster from the middle of the posterior aspect of the upper arm, down the ulnar aspect of the forearm to the dorsum of the hand at the heads of the metacarpal bones. A well-fitting triangular sling is equally satisfactory. Operation is not indicated, nor is any attempt at correcting the slight displacement present needful.

When the head is split into a number of fragments with a fissure traversing the neck close to the attachment of the synovial membrane to the bone, the treatment is as already described, excepting the hand should be carried into as much supination as the patient will permit. Recovery is less rapid, function is more interfered with, and operation is at times needful.

In cases of epiphyseal separation the arm is splinted at right angles in supination for a week, and then carried in a sling. Thereafter the patient is encouraged to use it. The results are good. Restoration of function was in all cases, barring an operative one, complete.

Where the head was fractured with wide displacement of the fragments practically all were operated upon early, in the main by removing the head and neck as far down as the bicipital tubercle.

Removal of the displaced fragment was done twice; the function was not nearly so satisfactory as in cases of complete removal. In these cases of removal of the head and neck of the radius there was a loss of 10 degrees of supination. Flexion and extension were limited to about 5 degrees each way from a right angle by new bone deposited in the capsule of the elbow-joint, and were not improved by any treatment.

Fractures of the neck of the radius were treated by supinating the forearm fully with the use of anterior and posterior molded splints from the middle of the upper arm to the middle of the palm. The splints should be worn for four weeks. Attempts to correct slight displacements are futile. The resulting function is very satisfactory. Flexion and extension are practically normal, pronation and supination are limited to less than 5 degrees.

Mock, writing on "Fractures of the Fingers and Toes," observes that the most important considerations in these cases are diagnosis; proper reduction and splinting with a view to obtaining perfect functional restoration; treatment of the injuries to the soft parts which so frequently accompany fractures of fingers and toes, with the view of first saving as much function as possible in the tendons, nerves and muscles, the proper alignment and union of the fractures being of secondary consideration; methods best adapted to overcome deformities and to restore function in the hand or foot.

He gives detailed directions concerning treatment based on a large experience in industrial surgery.

Speed contributes a paper on "Intertrochanteric Fracture of the Femur," based on the study of 120 cases. After discussing the various forms this fracture may take, and giving a brief but excellent summary of signs and symptoms, he states that we can anticipate a union in practically every case following a short rest in bed with little immobilization.

As for treatment the indications are satisfied by extending the leg by traction, abducting it to the maximum, turning the foot slightly inward, and placing the patient in a body cast, such as is used for fracture of the neck of the femur. This cast may be worn for six to eight weeks. The patient can then become ambulatory, wearing a caliper for six weeks to take weight off the young callus, moving his hip while not bearing weight.

As to results, there is usually some restriction of hip motions no matter how perfect the reduction of fragments. Where proper reduction and immobilization have not been followed, we may expect shortening up to one inch, seldom more, considerable excess callus which leads to restriction in hip-joint function, and some adduction of the leg on account of the change of neck angle. Bony union, however, permits weight-bearing and a fair degree of function even to old people. The average age of a person suffering these fractures is over sixty-two years. As to the cause of fracture a large majority gave this as a fall on the hip. All instances of intertrochanteric fracture arising in younger patients gave a very definite history of severe direct trauma. In the 120 patients reported 20 died.

Moorhead writes on "Standardized Treatment of Fractures of the Leg." He calls attention to the frequency of nonunion in the lower third of the tibia and

the almost total absence of non-union in fracture of the fibula, even in the presence of marked over-riding or gross deformity. Compound fracture of the leg is more prone to infection than any other compound fracture, mainly because the tibia is subcutaneous, with stasis of circulation acting as a contributing factor.

He notes the frequency of blebs, which may be massive and numerous. He cautions concerning the exposed position of the external popliteal nerve, which makes it subject to pressure palsy, and calls attention to the frequency with which a long oblique fracture of the lower third of the tibia is associated with fracture of the upper end of the fibula.

In fracture of the leg with little or no deformity, the part is splinted into a two-piece anteroposterior molded plaster-of-Paris casing reaching from the toes to six inches above the knee. If the fracture is at or above the base of the malleolus the splint does not include the knee. If there is displacement this is corrected at once if possible. If fracture be irreducible operation is indicated. Operation would seem to be indicated, but can often be avoided by what the author calls skeletal traction—*i.e.*, a pull downward and continued until the effect is produced by means of calipers or bands or nails applied to the bone.

As a traction agent the author expresses a preference for the stirrup passed over the os calcis, or the tongs thrust into the malleoli. He holds that in another five years plates now used in the course of operation will be as rarely employed as are wooden-handled instruments. In all forms of traction the direction of the pull is that of the upper fragment, and counter-traction is best obtained by elevating the foot of the bed. Ten- to twenty-pound weights are employed first, so that muscle spasm may be overcome. As soon as this is accomplished the weight of five pounds is enough. Fracture is set not by setting the bone, but by setting the muscles which maintain bony malalignment.

To properly reduce a Pott's fracture anesthesia is needful. Relaxation of the tendo Achillis is the next essential. Hence the thigh must be folded fully on the abdomen. Next the foot should be firmly grasped and the deformity markedly increased up to the point of obtaining very free false motion and crepitus. Then slow and gradual downward traction is made until a sensation of "giving" is felt. Next the foot is brought as far forward and inward as possible. If the correction is satisfactory the bony deformity disappears, the malleoli are on a proper level, and pressure of one finger against the sole holds the foot at the right angle. A loop of a bandage is then placed around the big toe, and the free end of this is given to an assistant until the patient is out of anesthesia or the splint is in place, the latter being, as already stated, a two-piece molded plaster-of-Paris casing. The posterior portion of this 4-inch-wide strip passes from the web of the toes, along the sole, over the heel, and up the back of the leg to the lower part of the popliteal space. The lateral 4-inch piece begins over the inner malleolus, crosses the instep, passes under the sole (surmounting the posterior part of the splint), and goes up the inner side of the leg as high as the other part of the splint. A bandage holds both sections of this posterolateral plaster mold, and the anterior half is removed daily or less often for massage. The outer portion of the leg is free for inspection and circulation.

Passive motion of the ankle begins within the first week, active motion about the tenth day, the ankle being held during the early phases of this part of treatment. In no fracture is early mobilization so important, otherwise organized exudate from associated synovitis, arthritis and myotenosynovitis will produce stiffness despite accurate bony readjustment. The lateral half of the splint can be removed as soon as union is relatively firm and when active ankle motion causes no reaction. This is ordinarily at the end of a fortnight, and thereafter the posterior part of the splint is gradually shortened so that it is all off by the end of the fourth week. Adhesive strapping or a linen-mesh bandage is then substituted, and

walking on the flat of the foot is allowed when pounding on the heel or firm pressure on the sole is painless. The patient is made to toe-in at first so the eversion is prevented; in some cases building up of the inner side of the sole and heel will aid in this element of treatment.

Cotton, writing on "Treatment of Ankle Fractures," observes that overcorrection is impossible, and that if the foot can be overcorrected the diagnosis is wrong.

As to the treatment of blebs he holds that opening the blebs and an alcohol dressing are the best means of preventing subsequent infection. Splints are uniformly inferior to plaster of Paris, except possibly when both bones are broken above the ankle. The best way of applying plaster is to first wrap the leg in a moderate covering of sheet wadding, then put on the plaster bandages, not tightly, but rolled on.

The important thing is that after the plaster is on, before it sets, the reduction which has been found effective in this case is again carried out, and pressure kept up with the hands in the proper places so as to maintain reduction, until the plaster becomes sufficiently hard to hold the foot in position.

Right-angled dorsal flexion is always maintained if possible. The cast should be left on for from three to six weeks.

Estes writing on "Pott's Fracture of the Fibula, or Fracture-Dislocation at the Ankle," states that reduction is accomplished under complete anesthesia. As for splints, Estes prefers in place of rigid splints of boards or metal, plaster of Paris with strips of flexible wood worked in so as to meet the requirements of each case. It is best to put the foot up in a slightly inverted, slightly adducted position for the first week; then remove the dressing, massage the foot, ankle-joint and lower leg, and reapply a molded splint with the foot in its normal position. Right-angled dorsal flexion is always maintained. If possible the cast should be left on for from three to six weeks. Estes states it is rare to have a perfect restitution of function, and that in rheumatic and gouty subjects this injury is likely to be followed by intermittent pain.

Immunity in Surgery.

Under this title ARMSTRONG *(Surgery, Gynecology and Obsterics,* May, 1921) defines immunity as the sum total of all interactive processes which proceed in an organism when resisting invasion. Protective immunity is, therefore, only a relative phenomenon, although in the gradual evolution of the species it assumes a growing importance, because only those organisms survive which are endowed with so-called protective reactions, that is, are enabled through manifold endowment to adapt themselves to changing requirements of environment. It is important to remain conscious of this broader conception of immunity, for it places it entirely within the sphere of general biological laws and cell responses irrespective of their desirable or undesirable individual results.

The ideas of Ehrlich, which, as we all know, held the whole field for a time, were entirely chemical. He regarded the toxin of bacteria as a definite chemical compound which was neutralized, like an acid by an alkali, or by another chemical compound, the antitoxin, manufactured by the body cells. But we are to-day very far from regarding this as so simple a process. On the contrary we have learned that the toxin-antitoxin reactions are extremely complicated colloidal phenomena and that toxins and antitoxins are themselves so complex that their chemical entity is quite uncertain. It appears that toxins and antitoxins are very large colloidal combinations, not simple chemical compounds. They are not actually dissolved in the blood, like crystalloids, but rather suspended or emulsified. They unite by selective absorption, and not by simple chemical reactions.

When we have suspended in a medium a number of non-miscible substances (as for instance, colloids in the blood) the surfaces of these substances are in a state of surface tension, and work may be done by these surfaces when the tension is able to diminish. At the interfaces of these substances (that is, between them) there is, therefore, a local accumulation of free surface energy, and this can be reduced by the deposit of

substances with low surface tension at the interface. Consequently, according to a law formulated by Gibbs and Thompson, it follows that substances which lower surface tension will be concentrated and then precipitated on the surface and the energy will be lessened thereby. Thus colloidal complexes adhere to each other in relation to surface energy. This is, therefore, a physical and not a chemical union, and adsorption is distinct from absorption, in which one substance unites with another to lose its identity. Absorption of some colloidal constituents may follow, but this is a secondary matter incidental to adsorption.

Inasmuch as adsorption in colloids is not, at least not essentially, a chemical reaction, but a physical union, dependent, as we have seen, upon phenomena of surface tension and surface energy only, it possesses a different biological significance from chemical reactions of two compounds. Thus, toxin-antitoxin union is rather a group phenomenon dependent upon physical characters, as contrasted with specific reactions of two substances. It follows, therefore, that immunity reactions are not absolutely but only relatively specific. This has been clearly established in the Wassermann reaction, and probably also explains the successful cures of certain diseases, like rheumatic arthritis, by non-specific, say typhoid, vaccines. We know that the fixation of the complement in the Wassermann reaction may not only be accomplished by syphilitic serum (that is, the so-called syphilitic antibody), but by other colloids (crystals and proteins) of similar physical character. These may occur in the blood after meals, after resorption of extensive inflammatory exudates, in acidosis, and in some other lesions. The opposite has also been established, for withdrawal or solution of these colloids from the blood, as, for instance, through ether narcosis, may render even a syphilitic serum incapable of entering into a positive Wassermann reaction, and thus the reaction may be absent in the blood, but still persist in the cerebrospinal fluid. We must, in order to employ this reaction for the diagnosis of syphilis, guard against the entrance of fat and foreign proteids into the blood which will simulate the syphilitic antibody, and we must also interpret the absence of the reaction *cum grano salis* and as influenced by individual circumstances of a case.

Two other important immunity reactions have recently acquired explanation and significance—chemiotaxis and phagocytosis.

It will be remembered that these, especially phagocytosis, played an essential rôle in the theories of immunity of Metchnikoff. He went so far as to believe that the ingestion and annihilation of bacteria by cells (phagocytosis) was the principal method of cell defense, and the researches of Wright and his pupils led them to believe that differences in phagocytic action depend upon the presence or absence of specific substances, opsonins, which prepared foreign particles for ingestion by phagocytosis; hence the importance of the so-called opsonic index in the blood as index of immunity.

Our ideas have here also undergone decided changes since we know that movement of and ingestion by cells are essential surface tension phenomena. Cells suspended in a medium behave as do drops of colloids, and their movements and ingestion of foreign particles depend not upon chemical affinity, but physical changes in their environment.

A drop of colloid suspended in a non-miscible or only very gradually miscible medium flows gradually toward an area of lessened surface tension in exactly the manner of a cell (ameboid motion). Movement of cells toward an object is, therefore, the result of lowering of the surrounding tension in that direction; movement away from an object, of increase of surface tension at one of the peripheral points. The cell rests when surface tension is everywhere equal. Positive chemiotaxis (movement to) (leucocytosis, cell exudate) is, therefore, identical with lessened tension in one direction; negative chemiotaxis (movement away) (leukopenia) with increased tension in a direction.

The important observations of Rhumbler

have further demonstrated that ingestion of foreign particles is essentially also a surface phenomenon. We can duplicate the same phagocytic action which we observe in the ameba in a drop of chloroform suspended in dilute alcohol, provided we offer to the chloroform a substance like shellac, which is soluble in, or "palatable to," it. Solid particles, like splinters of glass and wood, are rejected by the chloroform as by an ameba or leucocyte.

The point of practical importance is that, as our knowledge advances, the many theories which have been introduced to explain individual immunity reactions give way to applications of general physiochemical laws in conformity with other phenomena of cell life.

High Tracheotomy and Other Errors the Chief Causes of Chronic Laryngeal Stenosis.

JACKSON (*Surgery, Gynecology and Obstetrics,* May, 1921) thus summarizes his excellent article:

The most frequent cause of chronic laryngeal stenosis is high tracheotomy.

While in a given case no one has any right to say that the operation that saved that patient's life was an unjustifiable one, yet, equally rapid methods being available, high tracheotomy should not be taught.

The classic distinction between a high and a low tracheotomy with reference to the isthmus of the thyroid gland is a relic of the days when too much respect was had for the thyroid gland, or at least for its isthmus, and the distinction should be abandoned. The vitally important matter of where the trachea should be incised should not depend upon the negligible isthmus. There should be taught only one tracheotomy, and that should be low.

The trachea should always be incised lower than the first ring except in those rare cases in which laryngoptosis renders this impossible without entering the anterior mediastinum.

The cricoid cartilage should never be cut unless laryngoptosis places all the rings of the trachea below the upper border of the manubrium, which would require entering the mediastinum if the rule were to be followed.

The tracheotomic causes contributing to chronic laryngeal stenosis are:

(*a*) High tracheotomy.

(*b*) Hasty operation.

(*c*) Attempts at general anesthesia.

(*d*) Cutting of the cricoid cartilage.

(*e*) Hacking the trachea by several incisions instead of one.

(*f*) Denuding the tracheal cartilages of perichondrium with resultant necrosis.

(*g*) Suturing the wound.

(*h*) Prolonged wearing of a cannula that is of improper size, shape, or material, such as rubber or aluminum, or one with a fenestra, or one without a pilot.

(*i*) Neglect of proper after-care. The key-note of the after-care should be that it is a plumber's job; the "pipes," natural and instrumental, must at all times be kept clear.

If in an emergency a high incision of the trachea has been made, a cannula should not be worn in it. As soon as the patient's breathing has been resumed a low incision should be made and the cannula should be inserted therein.

Going deeper, the fundamental cause of so many cases of chronic laryngeal stenosis lies in the faulty teaching in the surgical text-books. The eminent surgeons who write text-books would not do a tracheotomy through the larynx to avoid the isthmus of the thyroid gland, or because of haste; but eminent surgeons are not often at hand when emergency tracheotomies are required. These operations are usually postponed until respiration has ceased. If not already stopped the practitioner promptly stops it by attempting to give a general anesthetic.

In conclusion, the author apologizes for the foregoing constructive criticism of the modern surgical text-books that have perpetuated the errors of the ages, and offers as palliation the excuse that his life has been largely spent in combating the chronic laryngeal stenoses that have resulted from errors unconsciously committed in faulty,

though often life-saving, tracheotomy. And if the language seems to any one unnecessarily vigorous, his attention is called to the fact that previous milder statements to the same effect have been ignored, utterly failing to check the steady stream of needlessly created chronic laryngeal stenoses pouring into the clinic. Perhaps, too, the vigor comes as the venting of pent-up thoughts that could be communicated neither to the patient nor even to the respective tracheotomists who had saved the patients' lives. The fault lies not with either of these classes of individuals, but with the surgical text-books of to-day, which perpetuate a faulty teaching.

Acute Intestinal Obstruction.

FINNEY concludes an excellent paper on acute intestinal obstruction as follows in *Surgery, Gynecology and Obstetrics*, May, 1921:

Difficulty may be experienced in making a diagnosis, especially in postoperative cases.

Definite diagnosis is not necessary before operative measures are begun.

Early diagnosis is the most important factor in the whole category. It is better that the operation should be done early than well. Better a poor operation done on a patient in good condition than a good operation done on a patient in poor condition.

One is too largely influenced, perhaps, in delaying operation in the postoperative cases, by the fact (*a*) that the patient has just gone through a major surgical operation, and both he and the surgeon dislike exceedingly to submit again to that trying ordeal; (*b*) that so many cases, comparatively, have symptoms strongly suggesting intestinal obstruction, especially after certain forms of abdominal operation, and recover completely after rest, gastric lavage, starvation, enemata, and medical treatment —that the temptation is strong to postpone the operation unduly in the hope that relief may be afforded through these means. Hence often valuable time is lost in this way, and when operation is finally decided upon it is too late.

Reviews

STUDIES IN DEFICIENCY DISEASE. By Robert McCarrison, M.D., D.Sc. Oxford Medical Publications, London and New York, 1921.

Those who are interested in the progress of investigations on vitamines will read with much satisfaction this excellent book. Containing some 270 pages, it is divided into four parts, as follows:

Part I. Introduction—Vitamines — Experiments.

Part II. Factors Influencing the Onset of Deficiency Disease—Symptomatology.

Part III. Pathogenesis of Deficiency Disease.

Part IV. Practical Application.

In all there are 28 chapters with many illustrations, including microphotographs of tissue sections. Further, as evidence of the effort to have the text convey the most recent view-points, the author has included references up to a month before the forms were locked, March 1, 1921.

In the early part of the book, and, indeed, throughout all the text, the author stresses the fact that the relative degree of the effect of the deficiency of the vitamines is dependent upon the proper, or improper, qualitative and quantitative amounts of proteins, carbohydrates, fats and mineral salts in the diet. Thus, he states, "Vitamines, like other essential constituents of the food, are not to be regared as independent of the assistance desirable from their associates in the maintenance of nutritional harmony. Each vitamine is but a member of a team, and the team itself but a part of a coördinated whole."

The reader cannot but be impressed by the very careful and thorough manner in which McCarrison planned and carried out his own investigations. Having both the medical and the highly scientific view-points, the writer was able to correlate many of his findings so as to bring out practical clinical suggestions. The conservative and logical manner in which this is done adds only to one's conviction that the vitamines are perhaps, speaking broadly, even more essential than we are inclined to think. Thus to quote from the summary on the section dealing with symptomatology, the author says:

"Recollecting that all these evidences of deficiency disease are influenced in their onset by the variety of factors to which reference has been made in Chapter IV; that their onset is invariably delayed by a lesser degree of avitaminosis and more perfect balance of the food, or hastened by a greater degree of avitaminosis and more imperfect balance of the food; that deficiency of one vitamine is often combined with deficiency of another, with excess of one proximate principle or with deficit of a second, it becomes evident that such permutations and combinations of factors intrinsic to the food and of factors extrinsic to it may occur as will include within their orbit a vast amount of ill-health among human beings at the present day."

The reports of studies of the pathogenesis, which are primarily from McCarrison's own laboratory, are the most extensive and complete that have been carried out. Considerable of this work has already been published in journals, notably the *Indian Journal of Medical Research*, the *British Medical Journal*, and the *Lancet*. Working not only with pigeons and guinea-pigs but with monkeys, it was found that many of the conditions brought about provided "the pathological basis for attaching to food deficiencies a prominent etiological significance in regard to that great mass of ill-defined gastrointestinal disorders and vague ill-health which throngs clinics at the present day, and concerning which we have hitherto known little or nothing."

As McCarrison puts it—"The place of vitamines in the human economy must be considered in connection with metabolism as a whole, in connection with their relation to the organs of digestion and assimilation and with their relation to the endocrine regulators of metabolic processes." He is firmly of the opinion that many of the gastrointestinal disorders are due to food deficiency, as becomes manifest by the impairment "of the protective resources of the gastrointestinal tract and pathogenic organisms;" of the secretory and digestive functions; of the assimilative power; and of the neuromuscular control of the stomach and bowel. He finds with the vitamine deficiency not only scurvy, beriberi, rickets, which are commonly associated with it, but what is very common, but usually not associated with faulty diet, loss of appetite, perverted appetite, loss in weight, lowering of body temperature, faulty calcium metabolism, cardiovascular depression, anemia, unhealthy skin, endocrine glandular changes, and symptoms due to malnutrition of the nervous system.

It is interesting to note that he was able in his own clinic to regulate many of these conditions in patients by using extracts containing the vitamines. Attention is called to the fact that even though one may have access to vitamine-containing foods, it does not follow necessarily that they eat the adequate amount of food, or assimilate their food properly. These are questions which should always be considered. Further, he suggests that more information should be available as to how to conserve the vitamines in the foods during the processes of preparation and cooking.

Throughout the book, it is evident that the author has accumulated considerable evidence to substantiate his deductions. We may criticize possibly from the standpoint that some of the work in America has not been quoted as freely as it should—particularly the work of Howe on dental conditions. Nevertheless, the literature on vitamines is becoming so voluminous that it is almost unwieldy.

The book should occupy a place in the library of every up-to-date physician.

A. D. E.

CLINICAL EXAMINATION OF THE NERVOUS SYSTEM. By G. H. Monrad-Krohn, M.D., M.R.C.P., M.R.C.S., with a foreword by T. Grainger Stewart, M.D., F.R.C.P. H. K. Lewis Company, London, 1921. Price 6s.

In the space of 135 small pages, aided by twelve illustrations, the author of this little book gives succinct and definite methods of examining the functional ability of the nervous system in health and disease. The fact that Grainger Stewart has seen fit to write a foreword for it is in itself a strong recommendation. As Stewart points out, it is essential to have a routine method to examine the nervous system, since by this means time is saved and mistakes due to overlooking symptoms and signs are safeguarded. Stewart thinks that there can be no doubt that in the past the tendency to separate neurology from psychiatry has done much to hinder the progress of both of these branches of medicine.

Although the author is a Lecturer on Neurology in Christiania, nevertheless he has written the text in English, so that there is no danger of mistakes on the part of the translator.

It is a handy little manual for students of neurology which deserves to be cordially received.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume II, June, 1921.

Unavoidable delays in the printing office have prevented the appearance of the June issue of Progressive Medicine from coming out until July. This issue, as did those in previous years, deals with the Surgery of the Abdomen, Gynecology, and Disorders of Nutrition and Metabolism, Diseases of the Blood and Spleen, and Ophthalmology.

Altogether this volume contains nearly 400 pages. The authors are Dr. Charles of St. Louis, on Diseases of the Eye; Dr. John G. Clark of Philadelphia, on Gynecology; Dr. W. B. Coley of New York, on Hernia; Dr. E. H. Funk of Philadelphia, on Disorders of Nutrition; and Dr. A. O. Wilensky of New York, on The Surgery of the Abdomen.

The volume is freely illustrated and copious references are given to the literature which is quoted.

Correspondence

A New Method in the Treatment of Typhoid and Paratyphoid Fever.

To the Editors of the THERAPEUTIC GAZETTE.

Sirs: On May 21st I was called to see a patient, who proved to be the first of a series of epidemic cases from Lambs Camp, Menzies Bay. Within ten days 13 others were taken ill, and were in hospitals under treatment. Five ambulatory cases were also kept under observation, but did not become seriously ill.

The marked feature of every case was the intense toxemia and the severe nervous symptoms; the first case became very toxic, so that I despaired of her life. At that point I decided on the intravenous introduction of carbohydrates and alkalies, basing my reasons on the recent work published by Lawrence J. Henderson in Oxford Loose Leaf Medicine.

J. L. Miller has truthfully said toxemia is responsible for half the deaths in typhoid. In my patients I chose the time when they showed the signs of severe oncoming toxemia, alarming both to myself and patients' friends, for the beginning of this treatment. In the first three cases the patients were so ill that the relatives were sent for to be present at their expected death. The success of the method in these patients led me to give the treatment slightly earlier in the others.

These patients were given 10 to 12 ounces

of normal saline containing 2 drachms of glucose and thirty grains of soda bicarbonate; the latter was increased in some cases. This intravenous injection was repeated in two cases.

In all my patients a violent reaction took place in 40 to 60 minutes, viz., chills, great perspiration, and bowel movement. These symptoms were combated with the usual remedies, such as hot drinks, increased covering, and hot-water bags. In all the patients there was in six hours a marked fall in temperature, and in 16 hours all temperatures were normal. All those treated, although they had not slept for some nights, even with morphine, enjoyed a refreshing sleep of eight hours' duration. The appetite was also greatly improved even with some who had refused food before treatment. The mental drowsiness and apathy improved at once. The matron and her staff were quick to see the improvement, and within a few hours all patients ceased to be a source of worry to myself or the rest of the staff.

Of six patients treated by the usual methods, four died.

Dr. Walker, of the Provincial Health Office in Victoria, was sent for to investigate, and in company with him I visited the camp. He took back with him samples of water and samples of blood and stools from various infected patients, and reported as follows:

Wicksburg, deceased, stools contained typhoid and paratyphoid bacilli, and blood culture positive.
Miller, stools contained typhoid bacilli only.
Ramsey, stools contained typhoid bacilli only.
Lamb, stools contained typhoid and paratyphoid bacilli.

These results were confirmed by reports from Vancouver General Hospital.

The water examination was negative. All evidence of infection centered on two cooks, who were in the camp a week, about five weeks previously. Efforts are now being made to find these cooks and have them tested.

Thus we see that the preponderating infection was a mixture of para and true typhoid.

Cases are divided as follows:

Case 1.—Mrs. G., aged nineteen; admitted May 22. Temperature 104.4°, pulse 108; complained of great pain over right epigastric region and back, severe headache, weakness and diarrhea. She became very toxic and mentally apathetic, refusing food on May 27. At 3 P.M. an intravenous injection was given. In forty-five minutes there was a severe reaction, chills, perspiration. The usual treatment as outlined above, and strychnine 1/40, pituitary, morphine 1/8 grain, with atropine, were given. At 9:30 P.M. temperature was 99°. On May 28 at 5:30 A.M. temperature was 97⅔°, pulse 66. In the next three or four days there were slight rises to 100°, and after that uneventful recovery. June 15 she was discharged convalescent. The most striking results in this patient were the immediate clearing of mental apathy, the drop in temperature, and return of appetite the following morning.

Case 2.—Mr. J. L., aged forty-eight; admitted May 25, 8 P.M. Temperature was 100°, pulse 80. Complained of severe pain in right epigastric region and back, headache, diarrhea, weakness, and inability to sleep. The temperature and pulse continued about 100° to 102° until June 3, when his condition suddenly became very toxic and weak and very serious. On June 3 an intravenous injection was given at 3 P.M. and reaction similar to Case 1 occurred On the following morning the temperature was 98° and he had the first real sleep since arriving at the hospital. He was greatly improved, and recovery was rapid. He sat up June 21, and is still in hospital, convalescent.

Case 3.—C. R., aged thirty-three; admitted May 27, 8 P.M.. Temperature 102°, pulse 98. Complained of similar symptoms as Cases 1 and 2, but the nervous symptoms were much more severe. He was unable to sleep even with opiates. On June 4 his relatives were sent for, as I considered his state very serious. An intravenous injection was given at 3 P.M. A slight reaction followed, but considerable improvement was noted. However, the nervous condition was still troublesome, and on June 7 a second intravenous injection was

given. In this the soda bicarbonate was increased to 100 grains, and the glucose to 3 drachms. A reaction, much severer than the first and corresponding to that of the other two cases, followed. The temperature fell on the following morning to 96.2°, pulse 78, and improvement was marked and continuous. He was able to walk on June 21.

Case 4.—J. H., aged thirty-two; admitted May 25. Temperature 102.6°. Symptoms as in other patients. On June 3 and 4 he became very weak and toxic. On June 4 an intravenous injection was given. Immediate improvement occurred. The following morning temperature was 99°, pulse 76. Patient was walking June 17 and was discharged convalescent June 29.

Case 5.—A. M., aged thirty; admitted June 4. Temperature 103°, pulse 100. He complained of the usual symptoms, but showed more prostration. On June 13 an intravenous injection was given. Marked reaction occurred as in other patients. June 15 the temperature was 98.2°, pulse 78. Condition greatly improved and able to sit up in bed; out of danger. On June 29 another injection was given this patient for lingering toxemia, and this hastened improvement.

Case 6.—F. M., aged eighteen; admitted June 6. Temperature 102°, pulse 82. Usual symptoms. June 12 an intravenous injection was given; June 13 temperature 97.4°, pulse 82. Recovery rapid. Now convalescent, and able to walk about. Still in hospital.

Case 7 (not included in series and given for demonstration).—G. W., aged thirty; admitted to Dr. C.'s service May 23. Severely ill up to June 5, when transferred to my service, at 12:30 A.M. Condition very weak, temperature 102°, pulse 100; fecal vomiting present. Unable to retain nourishment. In consultation with Dr. Lamb decided to give 4 ounces of solution, as condition was very weak and it was thought he would not stand much. In a few hours his general condition was greatly improved; vomiting discontinued. At 8 A.M. June 6 temperature was 98°, pulse 94, but he was still vomiting bile. At 10 A.M. 4 ounces of solution were given intravenously. General improvement continued through the day. Some rectal feeding had been given from the evening of June 5, but apparently it did not keep up the patient's strength. He died 2 A.M. June 7, conscious to the end.

It is apparent that the intravenous treatment of typhoid fever has, in the patients enumerated, been a success, and in my opinion, and that of the other physicians and nursing staff, undoubtedly saved the lives of these patients, as shown by the six controls.

The application of intravenous treatment to other types of infectious diseases presents a large field of exploration for the physician who is not satisfied with the old standard treatment.

Further observations are necessary. Reports on other cases will follow.

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